Livelihood Status of Fishers in India

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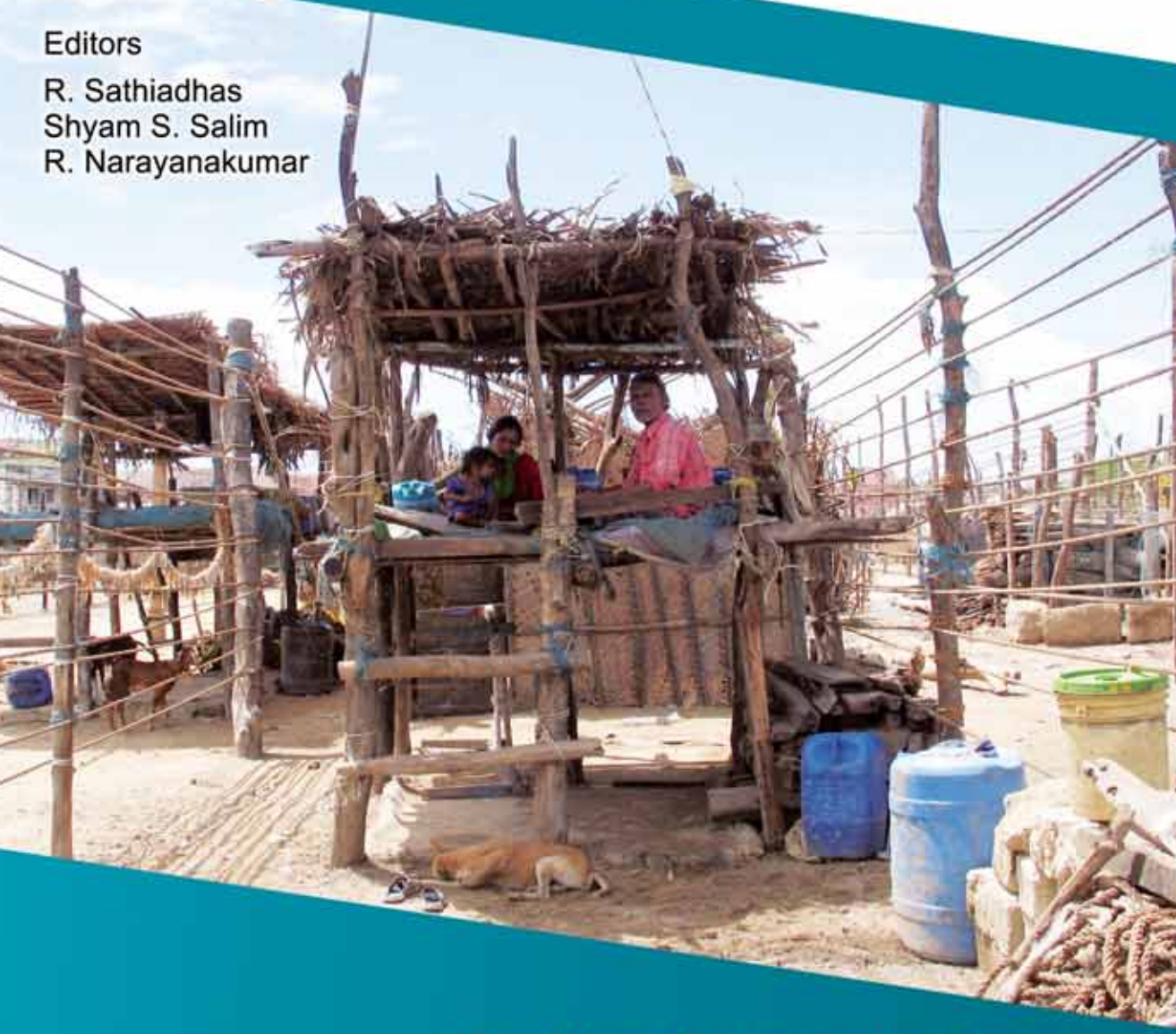

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Published by :
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Publication Production & Co-ordination
Library and Documentation Centre

Secretarial Assistance
Bindu Antony, Rajani Jayakumar, Athulya M.A, Safeena P.K.

Photos & Illustrations
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Citation: R. Sathiadhas, Shyam. S. Salim and R.Narayanakumar (2014)
"Livelihood Status of Fishers in India" published by Central Marine Fisheries Research Institute, Cochin pp. 348
ISBN 978-93-82263-05-0

Printed at: St. Francis Press, Kochi-682018

Livelihood Status of Fishers in India

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CMFRI, Kochi initiated a network research project entitled " An Assessment of literacy, income and health status of fishers in India" funded by the Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, India. Central Institute of Fisheries Education, Mumbai, Central Central Institute of Brackish water Aquaculture, Chennai, Central Inland Fisheries Research Institute, Barrackpore, Central Institute of Fisheries Technology, Kochi, Central Institute of Fresh water Aquaculture, Bhubaneswar, National Centre for Agricultural Economics and Policy Research, New Delhi and Fisheries Division, ICAR, New Delhi were the partnering institutions The project had an outlay of Rs 13.68 lakhs.

FOREWORD

The fisheries sector in India is of utmost significance owing to its economic importance, and due to the fact that it is a flourishing sector with varied resources and potentials.The fisheries activities are a source of livelihood and foreign exchange, thereby ensuring livelihood security. With the overall estimated total landing transcending 9.60 million tonnes, the Indian fisheries sector is poised to enter a new R&D trajectory. The marine fisheries production has shot up to 3.78 million tonnes from a mere 0.53 million tonnes in 1950's.Just as the marine fisheries, the inland aquaculture and cultured based fisheries has a vast production potential and has shown a remarkable average growth of 4.43 percent over the plan years. The GDP of the fisheries sector during the recent past was Rs.78,000 crore, contributing to 0.83 percent to national GDP. Not just this, but the fisheries sector plays a crucial role in sea food exports which has been unabated even during global recession.

Even with the plush phenomenal growth of the fisheries sector the socio- economic status of fishershasn't improved much in terms of social standards such as literacy, income and health status when compared to other agriculture and allied sector.The livelihood of the stakeholders of the fishery sector plays a significant role in the successful implementation of any fisheries management measures. Lack of economic security among the stakeholders often leads to indiscriminate harvest of the fishery resources, resulting in irreversible damage to the fishery sector, thus to achieve sustainable fishing in India, the right balance of between environment and development needs to struck. The responsibility to show the way to successful and sustainable income earning through alternate livelihood options (ALO'S), which will help to reduce the pressure of fishing in the seas lies with the research community.

In our constant endeavor to monitor the ecological well-being of the resource base we have played the role of a responsible sentinel through releasing relevant policy advices for fisheries management. This study takes a further step in analyzing the wellbeing of the resource users. It is in this spirit that the results of a nationwide appraisal project have been consolidated to bring out a new series of policy brief requirements of each maritime state of the country. During the development of fishery plans, it was realized there was a dearth for quality data related to socio-economic standards of the fishers in the country, this has become a major hitch for the policy planners. In order to better the situation, the Department of animal husbandry, diary and fisheries (DAHD) proposed and granted this project to CMFRI, with the able support of other reputed institutions such as Central Institute of Fisheries Education, Mumbai, Central Institute

of Brackish Water Aquaculture, Chennai, Central Inland Fisheries Research Institute, Barrackpore, Central Institute of Fisheries Technology, Kochi, Central Institute of Freshwater Aquaculture, Bhubaneshwar Centre for Agricultural Economics and Policy Research, New Delhi and Fisheries Division, ICAR, New Delhi. The project was carried out with full zest.

I compliment the entire team led by CMFRI and Socio Economic Evaluation and Technology Transfer Division (SEETTD) to have brought into the limelight the issue oftradeoff between trade and development, besides focusing on community participation on fisheries management. I would also like to state that, this study is a pioneer attempt in this arena and has scope for further exploration. I wish to avail this opportunity to sincerely acknowledge the unstinted effort of R. Sathiadhas, Shyam S Salim, R. Narayanakumar and the entire team for the completion of this project in time and in bringing out this document which would serve as forerunner for future studies in this field.

Cochin
13.10.14

A. Gopalakrishnan
Director

PREFACE

Indian fisheries and aquaculture is an important subsidary of agriculture, providing employment, food and nutritional security particularly to the rural poor and better access to protein rich food for all. It is also contributing to the agricultural exports and engaging about fourteen million people in different activities. With diverse resources ranging from deep seas to lakes in the mountains and more than 10 per cent of the global biodiversity in terms of fish and shellfish species, the country has shown continuous and sustained increments in fish production since independence. With support of government initiatives and policies, various innovations by scientific community, support from private industries and companies, fishermen, farmers NGO's and self help groups, the sector has evolved from a modest, traditional and subsistence level to a sophisticated and modern enterprise. The country now occupies the third position in total world production and second in aquaculture production. 'Fish for All forever' necessitates the sustained development of the sector to cater nutritional needs of millions of people in future. India with water ranging from seas to cold hill streams and over 10 per cent of the fish biodiversity on earth has high scope for producing fish by utilizing the untapped potentials of inland and marine sector.

CMFRI, Kochi has initiated a network research project entitled " An assessment of literacy, income and health status of fishers in India" funded by the Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, India for a period of one year starting from November 2009. CMFRI is the lead center with Central Institute of Fisheries Education, Mumbai, Central Institute of Brackish water Aquaculture, Chennai, Central Inland Fisheries Research Institute, Barrackpore, Central Institute of Fisheries Technology, Kochi, Central Institute of Fresh water Aquaculture, Bhubaneswar, National Centre for Agricultural Economics and Policy Research, New Delhi and Fisheries Division, ICAR, New Delhi as the partnering institutions.

We thank profusely to the entire team for the completion of this project in time. Our sincere thanks are due to Pradeep Katiha, Senior Scientist, CIFRI, Barrackpore, Kolkata, M. Krishnan, Principal Scientist, CIBA, Chennai, Nagesh Kumar Barik, Scientist, CIFA, Bhubaneswar, Nikitha Gopal, Senior Scientist, CIFT, Cochin, Ganesh Kumar, Senior Scientist, NCAP, New Delhi,Arpita Sharma, Principal Scientist, CIFE, Mumbai, Rakesh Kumar, Technical officer, Fisheries Division, ICAR, New Delhi, R.S.Biradar, Former Joint Director, CIFE, Mumbai, Ponnusamy. K, Principal Scientist, NDRI, Karnal.

We are obliged to project associates, data enumerators, field staff for their valid helps in this project. We express our deep sense of gratitude and heartfelt thanks to the Director, Dr. A. Gopalakrishnan, CMFRI, for his constant encouragement and valuable guidance, and we offer our sincere thanks to Dr. G. Syda Rao, former Director, CMFRI for his support and guidence during the entire period of this project. Also thanks are due to DDG, Fisheries and all the Directors of the partnering ICAR institute who had guided in the successful completion of the work in time

Finally immense gratitude is due to all our colleagues, staff of socio-economic evluation and technology transfer division and all the respondents of this project for their kind co-operation to contribute to this endeavor.

R. Sathiadhas
Shyam. S. Salim
R. Narayanakumar

13.10.14

CONTENTS

LIST OF ACRONYMS

AIDS	Acquired Immuno Deficiency Syndrome
AP	Andhra Pradesh
AS	Assam
BCG	Bacillus Calmette-Guerin
BH	Bihar
BWA	Brackish Water Aquaculture
CPR	Common Pool Resource
DAHDF	Department of Animal Husbandry, Dairying and Fisheries
DoFs	Department of Fisheries
EEZ	Exclusive Economic Zone
EU	European Union
FAO	Food and Agricultural Organization
FFDA	Fish Farmers Development Agency
FWA	Fresh Water Aquaculture
GDP	Gross Domestic Product
GU	Gujarat
GA	Goa
HP	Himachal Pradesh
HACCP	Hazard Analysis and Critical Control Point
HIV	Human Immunodeficiency Virus
HRD	Human Resource Development
ICMR	Indian Council of Medical Research
IOD	Incidence of Discontinuation
JH	Jharkhand
KN	Karnataka
KR	Kerala
LIC	Life Insurance Corporation of India
LPG	Liquefied Petroleum Gas
MP	Madhya Pradesh
MFRA	Marine Fisheries Regulation Act
MMR	Measles, Mumps and Rubella
MPEDA	Marine Product Export Development Authority
NATP	National Agricultural Technology Project
NFDB	National Fisheries Development Board
NGO	Non-Governmental Organization

OR	Orissa
PDS	Public Distribution System
PHC	Primary Health centre
PU	Puducherry
RFD	Results Framework Document
SHG	Self Help Group
SIFFS	South Indian Federation of Fishermen Societies
SPS	Sanitary and Phyto sanitary
TB	Tuberculosis
TN	Tamil Nadu
UP	Uttar Pradesh
UNESCO	United Nations Educational, Scientific and Cultural Organizations
UNICEF	United Nations International Children's Emergency Fund
WB	West Bengal
WHO	World Health Organisation

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EXECUTIVE SUMMARY

The project envisaged with the objective to assess the status of literacy, health and income of marine and inland fishers, fish farmers and workers in allied activities both in capture and culture systems. The study covered the fishers from all the maritime states and selected inland states. The literacy, income and health profiling of the fishers was done from the different fisheries and aquaculture resources including marine capture, mariculture, reservoirs, wetlands, rivers, estuaries, brackish water and coldwater, ponds and tanks, processing sectors and marketing functionaries. Around 4500 fisher households representing the different sector were collected and detailed analysis was done

General particulars

The general particulars of respondent households included age, family size, family composition etc. The age distribution of the sample respondents across the different sectors indicated that 51.75 per cent of the respondents were of the age group of 36-55 and 30.76 per cent of the respondents were of the age group less than 36 years. It is heartening to note that the fisheries sector continue to attract the young and medium age group.

The family composition of the respondents in terms of male and female indicated that the male outnumbered the females and the male - female ratios was estimated as 1.13. The results of male female ratios of the different sectors are in conformity with the national average of 1.15.

The small family norm is mostly adopted by the fisher households of India. The average size of family in India worked out to be 4.34 ranging from 3.70 in mariculture to 4.78 in fresh water aquaculture. There exists no difference in the family size across the different sectors which indicate the popularization of the small family norm across the state.

The male–female ratio of the adult group (>15 years) was found to be 1.10:1.00 whereas the same for the children (<15 years) was found to be 1.14:1.00.

Literacy profile

The overall literacy rate for the total samples was found to be 79.37 per cent much higher than the sector literacy rate across the country. The general literacy rate of India as a whole was 73.52 per cent (Census-2001) The results indicate that among the literates 32.85 per cent have primary level of education, 53.88 per cent have secondary level of education and 13.10 per cent have collegiate level of education. The results indicate that the literacy does not seem to be skewed towards any particular sector among fisher population.

The dropouts were more at secondary level of education with 50.90 per cent and the dropout at primary level of education was about 41.08 and that of collegiate level was 8.02 per cent. The continuing and dropout ratios was 0.62 for the entire sector ranging form 0.44 in brackish water sector to 0.99 in the case of marketing and processing sector. Alternative source of livelihood, possibility of seeking employment in fisheries enterprises, scope of labour can be the reasons for the increasing dropouts among the urban states.

The access to education could be measured in terms of distance to nearby educational institutions. As a whole the average distance to a primary school is 1.46 km, high school 3.40 km college 13.33 km and professional institution 19.48 km from fishing villages in India.Thus the analysis clearly indicates that the improved or increased access to educational facilities has helped to increase the literacy level of the fisherfolk.

Health profile

The average age to which the vaccination for pox was given to the child worked out at 1.79 years ranging from 1.00 years in freshwater aquaculture to 6.20 years in the case of cold water fisheries sector. The average age at which the vaccination for BCG was given to the child worked out at 1.08 years ranging from 0.69 years in cold water fisheries and inland capture sector to 2.62 years in the case of marine capture fisheries sector. The average age at which the vaccination for MMR was given to the child worked out at 1.21 years ranging from 0.96 years in inland capture fisheries sector to1.90 years in the case of cold water fisheries sector. The average age till which the vaccination for polio was given to the child worked out at 4.67 years ranging from 3.58 years in inland capture sector to 5.70 years in the case of cold water fisheries sector.

The average birth weight of males was 2.72 kg and female was 2.67 kg. It was found that there exists no incidence of maternal mortality and was minimal at 0.20 per cent for maternal mortality rate and 1.88 per cent for infant mortality rate .

The access to primary health centre ranged from 1.67 km in the mariculture sector to 8.31 km in the case of cold water fisheries. The access to hospitals ranged from 4.32 km in the mariculture sector to 21.3 km in the case of brackish water fisheries.

Income profile

The highest monthly average income generated by the total respondents across different states was through fisheries sector with an average amount of Rs. 4345 (91.65 per cent of the total income) followed by income from business sector at Rs. 846, labour at Rs. 410 for agriculture, Rs. 373 for business and others Rs. 173

The highest average monthly income was noticed in marine capture sector at Rs. 8742 and the least was noticed in inland capture sector .The fisheries monthly average income was most for marine capture fisheries sector followed by marketing and processing and the least for inland capture. Labour monthly average income was most for mariculture (Rs. 1785) and the least for freshwater aquaculture (Rs. 287). Agricultural monthly average income was most for cold water fisheries (Rs. 812) and least for marketing and processing sector (Rs. 17)

The analysis on the respondent household's involvement in the non fisheries activities indicated that 71.45 per cent of the total respondents were involved in non-fisheries activities, which provided an additional source of income. Among the non fisheries activities it was found that labour was the most important source of income.

The results indicated that the average amount of indebtedness per person was Rs. 39807 and the average amount repaid was Rs. 9149.23. The average level of repayment was found to be 25.93. and 48.12 per cent of the fishers were in indebtedness.

The indebtedness often results in availing loans from the different institutions. The major lending organizations include banks, co-operatives, private money lenders, friends/relatives and jewel loans.

Fisheries and aquaculture related activities like purchase of gears and other fishing related equipments were found to be the purpose of availing loans amongst 34.99 of the respondents across the sector. House construction and land purchase was the major reason for availing loans among 12.27 per cent of the respondents across the sector. It was found that of the 34.99 respondents who availed loans, more than 12.27 per cent was availed for the purpose of house construction and land purchase. Marriage expense, security and education and health was found as the reasons for availing loans among 7.51, 5.60 and 4.97 per cent of the respondents across the sector.

It was found that on an average only 34.99 per cent of the loans availed were used for the fisheries and aquaculture related activities ranging from 24.39 per cent in inland capture to 80.00 in cold water fisheries.

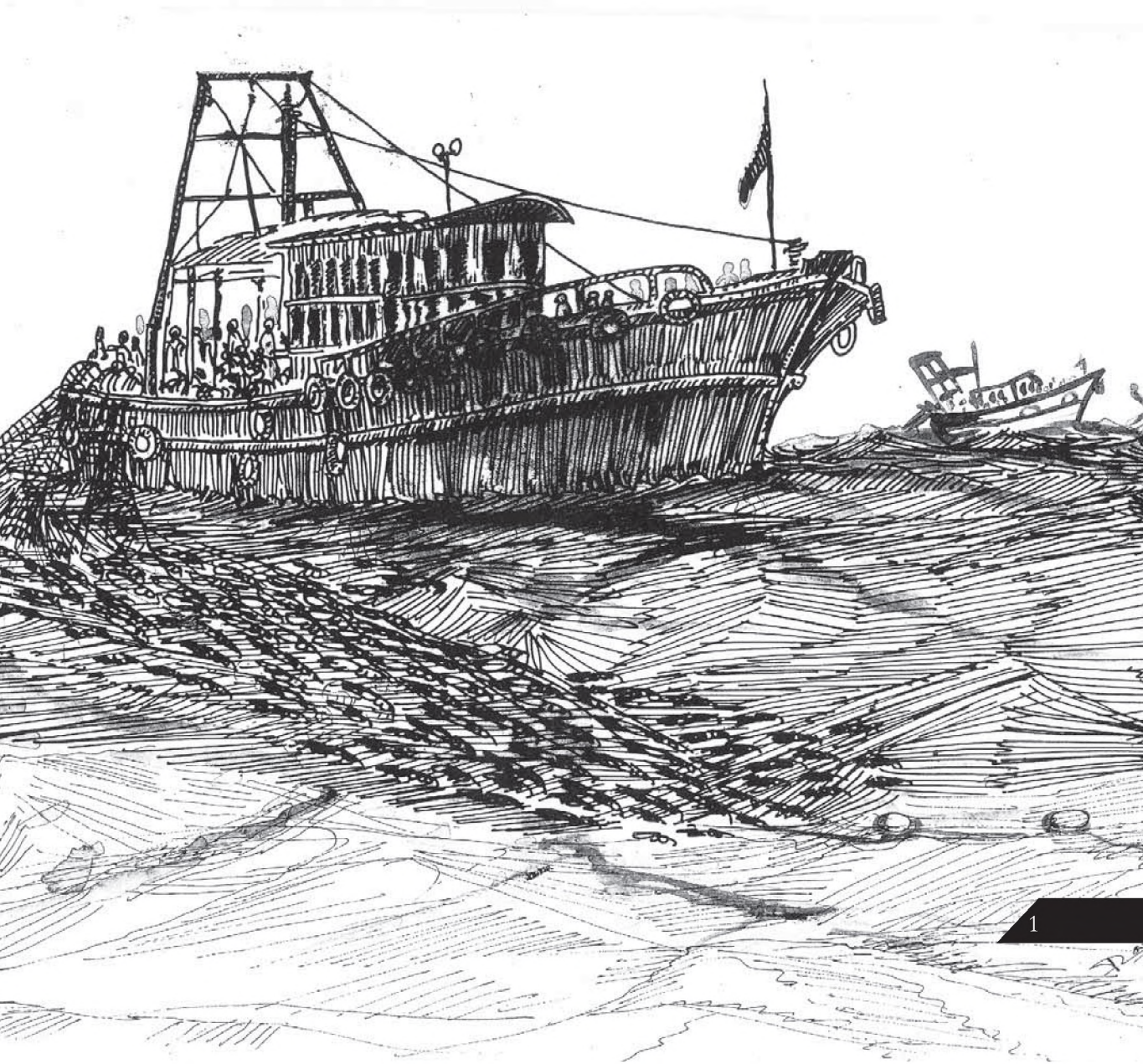
Conclusion

The study on the assessment of the literacy,income and health of the fishers concluded that

- The fishers literacy levels are comparable with agriculture households
- The access to educational institutions are good or even better of when compared to agriculture
- The health status appears appreciable with no life style disease noticed
- The health parameters related to child birth rate, mortality rate are highly appreciable on comparison
- Marginal infant and maternal mortalities are reported
- The income levels doesn't indicate any poverty among the household even though relative poverty exists
- The level of indebtedness is high but with more than 20% repaid
- Major sources of lending was found to be institutional credits
- 25 per cent or more of the loans was facilitated through private money lenders
- The usage of loans had been mostly for non fisheries purposes leading to NPAs

Indian Fisheries: The Setting

01



01

Indian Fisheries: The Setting

R.Sathiadhas, Pradeep Katiha,
Shyam. S. Salim and R.Narayanakumar

The Indian fisheries

Indian fisheries and aquaculture is an important sector of agriculture, providing employment, food and nutritional security particularly to the rural poor and better access to protein rich food for all. It is also contributing to the agricultural exports and engaging about fourteen million people in different activities. With diverse resources ranging from deep seas to lakes in the mountains and more than 10 per cent of the global biodiversity in terms of fish and shellfish species, the country has shown continuous and sustained increments in fish production since independence. With support of government initiatives and policies, various innovations by scientific community, support from private industries and companies, fishermen, farmers, NGOs and self help groups, the sector has evolved from a modest, traditional and subsistence level to a sophisticated and modern enterprise. The country now occupies the third position in total world production and second in aquaculture production. 'Fish for All forever' necessitates the sustained development of the sector to cater nutritional needs of millions of people in future. India with vast water resources ranging from seas to cold hill streams and over 10 per cent of the fish biodiversity on earth has high scope for producing fish by utilizing the untapped potentials of inland and marine sector. These resources at national level are summarized in Table 1.1.

Table 1.1 Indian fishery resources – a glance

Marine Resources	
Length of coastline (km)	8129
Exclusive economic zone(EEZ) million Sq.Km.	2.02
Continental shelf ('000 sq. km.)	530
Number of fish landing centres	1376
No. of fishing villages	3322
No. of fishermen families	764868
Fisher folk population	3574704

Inland Resources	
Total inland water bodies (lakh ha.)	73.59
Rivers & canals (km)	195210
Reservoirs (lakh ha.)	31.5
Tanks and ponds (lakh ha.)	24.14
Flood plain/derelict waters (lakh ha.)	7.98
Brackishwater(lakh ha.)	12.40

Source: From census reports and DAHDF publication

Fish production in India

Indian fisheries sector has growing steadily from the first plan onwards with the annual fish production of 0.754 million tonnes during 1950-51 to the level of 9.57 million tonnes during 2012-13.

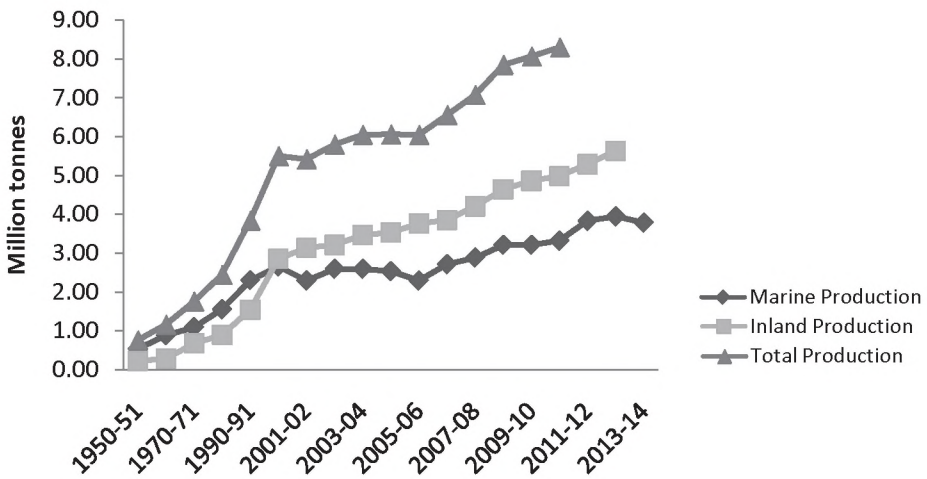


Fig 1.1 Trends in Indian Fish production (Total, marine and inland) from 1950-51 to 2012-13

The sector has vast production potential particularly for inland aquaculture and culture-based fisheries resources. It showed an average growth of 4.43 per cent over the plan periods. The marine fish production has increased from 0.53 million tonnes in 1950-51 to 3.78 million tones in 2013 -14. Inland fishery sector also grown steadily from 0.22 million tonnes during 1950-51 to about 5.63 million tonnes with an annual growth rate of 4.11 per cent in 2012-13. Although, evolved as a livelihood activity, fisheries sector in India had made rapid changes, transformed itself to the present status of an industrialized multi billion industry, contributing immensely to employment generation, food and nutrition security and foreign exchange earnings to the country.

Contribution of the sector to agriculture and national GDP increased steadily over the past few years. The GDP of fisheries sector reached at Rs. 78,000 crore during 2012-13 from

Rs. 9000 crore during 1993-94. Currently, fisheries contribute 0.83 per cent to national GDP of the country and 4.74 per cent of agricultural and allied activities.

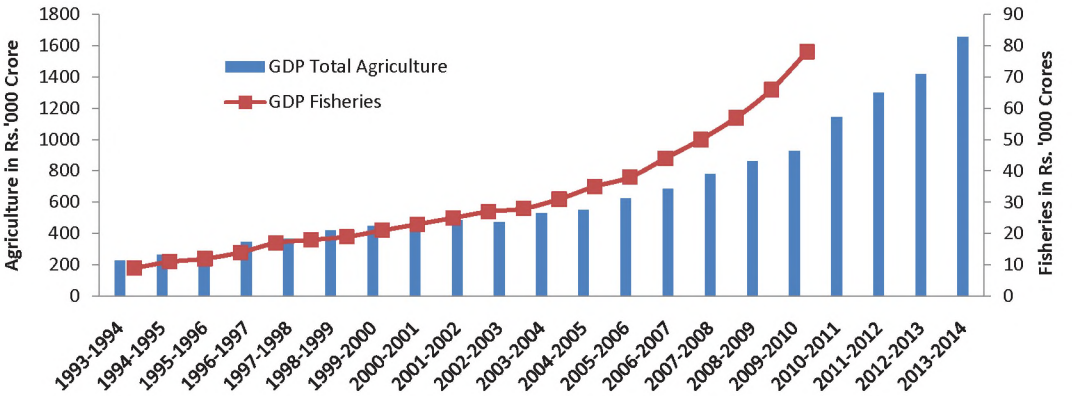


Fig 1.2 Gross Domestic Product of agriculture and fisheries sectors

Source: DAHD & F, 2008

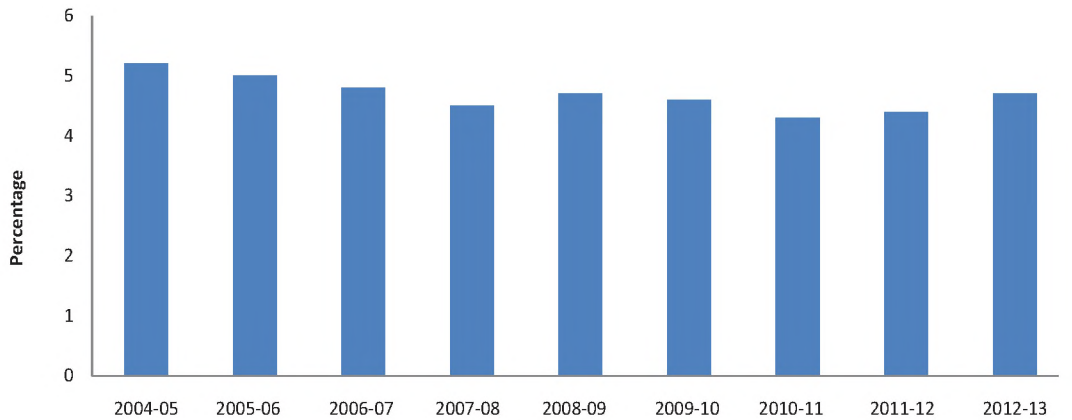


Fig. 1.3 Percentage share of fisheries sector in agriculture

Source: DAHD & F, 2008

Export of fishery products

The fisheries sector has been one of the major contributors of foreign exchange earnings through export. The marine products exports from India continue to surge up new heights and unabated by global recession. Frozen shrimp accounted for 64 per cent of the earnings followed by frozen fish and cephalopods. European Union is the prime geographic destination followed by US, China and South East Asia, for Indian seafood. The marine export value reported during 2013-14 was at 5.08 billion dollars.

The future of fisheries export would be influenced by the consistent compliance with food safety measures (HACCP and SPS standards). Cost of implementation of these measures are high and requires government policies and support system to be designed to minimize the cost of compliance with international standards to make smaller plants viable and export competitive.

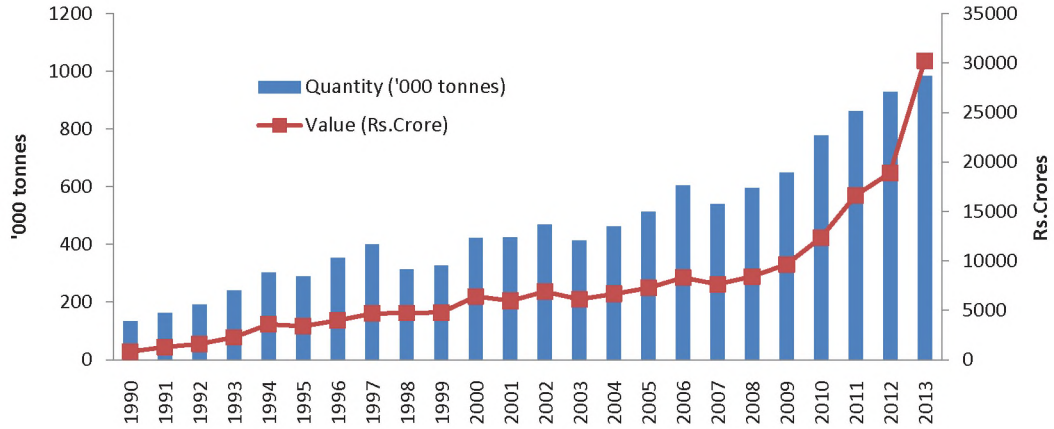


Fig. 1.4 Trends in export of marine products -1961-62 to 2013-14

(Source: Marine Products Export Development Authority)

Employment

Marine fisheries sector provides employment to nearly 32 lakh people in fishing and allied activities. About 11 lakh people are employed in fishery related activities like marketing of fish, repairs of nets, processing of fish, etc. Sector is also providing employment to nearly 10 lakh active fishermen and 11 lakh part time fishermen. Various welfare measures are in place to improve the living standards and income of the fishermen of the country. In the XI plan also due consideration was given to formulate programmes for the benefit of different stakeholders of the sector.

Coastal Fisheries

The production from marine sector has progressively increased nearly by six times during the past 50 years. Much of the fishing effort concentrated on the shelf fall within 2-200m depth. Analysis of the sectoral trend indicates that the mechanized sector accounted for 68 per cent, motorized 25 per cent and the rest by artisanal by yield. The inshore waters are under heavy or exhaustive fishing pressure. Present estimates showed that about 1.35 lakh mechanized and motorized crafts and about 1 lakh non-motorized crafts are engaged in fishing activities in coastal waters. Most of the resources are optimally exploited or marginally over exploited. The sustainability of many resources harvested from the coastal areas has been jeopardized by the incessant fishing pressure coupled with indiscriminate fishing of juveniles, increase in by catch and discards, impacts of pollution, and other anthropogenic causes. Interventions like regulating fishing pressure by adopting optimum fleet size and capacity, by catch reducing devices, strict adherence to gear and mesh regulations, stock enhancement programmes like sea ranching and diversification to tap exploited potential resources are needed to sustain marine fisheries in coming years.

Island Fisheries

The potential yield estimates for tuna from coastal and offshore Andaman waters is around 1lakh tonnes of which 800 tonnes is only harvested at present. Potential tuna resources in the seas around Lakshadweep have been estimated to be between 50,000-90,000 tonnes. About 10,000 tonnes of tuna are caught mostly by pole and line and troll lines. While the coastal fisheries are under heavy fishing pressure, the potential of island fisheries should be tapped judiciously. There is need for diversified fishing practices, provision of deep sea fishing vessels as well as on shore facilities for processing, for both export and domestic markets. Considering the fisheries wealth of island systems and the limited utilization of the resources, it is suggested that mechanism may be developed for harvesting, preserving, processing and transporting the catches from the islands to the mainland and for export.

Mariculture

The present marine fisheries scenario is characterized by declining yields from inshore waters and increasing conflicts among stakeholders, whereas the increasing demand for fish in domestic and export markets indicates good prospects for large-scale sea farming and coastal mariculture. The mariculture potential of India is vast, as there is great scope for developing farming of shrimps, pearl oysters, mussels, crabs, lobsters, seabass, groupers, mullets, milkfish, rabbitfish, sea cucumber, ornamental fishes, seaweeds, etc. Although about 1.2 million ha is suitable for land-based saline aquaculture in India, currently only 13 per cent is utilized. Mariculture activities are presently confined to coastal brackishwater aquaculture, chiefly shrimp farming. Cage culture has made possible the large-scale production of commercial finfish in many parts of the world and can be considered as the most efficient and economical way of rearing fish. The Indian coast offers many ideal locations for cage farming; potential sites include bays in Ratnagiri, Goa, Karwar, Palk Bay, Larsons Bay, Gulf of Mannar, Lakshadweep islands and the Andaman and Nicobar Islands. Potential fish species for cage culture includes groupers, snappers, seabass, rabbitfish and cobia. CMFRI has successfully demonstrated sea cage fish farming at selected locations along the coastline of the various states of India. Sea cage farming is a technology of great potential for augmenting fish production. Cage culture has the potential of progressively compensating the drop in marine fish catch.

Inland Aquaculture

The sector has established itself as the major contributor to Indian fish production. The fish yield from freshwater water bodies in form of ponds and tanks reached 1.8 t/ha from meager 50 kg/ha during 1974-75. Considering the potential of the resources, it has immense scope for vertical integration and horizontal expansion in form of increase in fish yield and brining more and more area under this activity. Further, Indian freshwater aquaculture is carp based and over 90 per cent of its production is either from Indian major carps or exotic carps. During XI Plan steps have been initiated to address different problems of this sector, e.g. diversification, fish feed production, quality fish seed, etc.

Inland Fisheries

As mentioned above, since mid-eighties the inland fish production favoured aquaculture over fisheries, due to number of reasons. Much emphasis has been laid on responsible fisheries in inland open waters, particularly the rivers and estuaries, but due to open access, multiple uses and other anthropogenic pressures, these measures could not yield expected results. The scope to harnessing untapped fish production potential for culture-based fisheries resources (reservoirs and floodplain wetlands) was highlighted many times at different levels. Last few plans also tried to address this sector. But, during XI plan under RFD programme of NFDB large number of reservoirs were stocked with fish seed. It resulted in significant enhancement in fish yield (small reservoirs from 50 to 174 kg/ha). The average yield estimated from Indian reservoirs (small, medium and large) during 2010 was 110kg/ha against 30 kg/ha during last plan. Floodplain wetlands are considered rich in aquatic biodiversity and provide sustaining livelihoods and nutritional security to large local communities. These natural aquatic systems which have high potential for increasing production and productivity, can be utilized for sustainable fish production without altering their ecological functions. The technologies for fisheries enhancements and enclosure culture (pen and cage) were also popularized for production of quality fish seed and table size fish.

Fish demand and supply as healthy food

The general awareness about fish as a healthy food and health concerns greatly influenced the consumption of fish in the country. The demand for fish and fishery products is increasing considerably both at domestic and export markets. The total demand for fish is projected at 9.74 million tonnes for 2012 and 11.85 million tonnes by 2017. The supply projections fall short of the demand and so the production and productivity issues of both inland and marine fisheries and aquaculture are to be addressed. Concerns about the quality and hygiene greater demand for improved and value added fish and fishery products are the other areas to be addressed. Thus the current plan should address the demand and supply of fish and fishery products along with quality concerns.

Ownership and water quality

Countries' vast open large water bodies and small closed water bodies have multiple users, ownerships and stakeholders. Realizing full potential from these water bodies by adopting improved/innovative technologies often constrains with these issues resulting in reduced production. Open waters are also constrained by environmental degradation and manmade modifications through water diversion schemes affecting fisheries. Concerns of property regime, overexploitation of natural stocks, ecosystem degradation, economic losses, etc. require immediate attention. The multiple ownership of water bodies for sustainable exploitation of fish stocks can be achieved through community participation and co-management. Implementation of code of conduct for fisheries is also a need of the hour.

Non food fisheries

Development of non food fisheries such as ornamental fish farming, pearl cultures, etc. are primarily aimed at the export and domestic demand. Presently most of the valued

varieties of ornamental fishes are caught from the wild, which have adverse impact on the natural resources and ecosystem. This is more prevalent in marine ornamental fish sector which is at initial stages of development in the country. Technologies have been developed for captive breeding and culture of various freshwater and marine ornamental fishes by various institutions. Further improvements of technologies is required to put the country in the global ornamental fish trade are to be taken on priority basis. Appropriate support on various inputs, skill development of entrepreneurs etc. are the areas to be looked upon.

Seed supply

The fish production from aquaculture largely depends on quality and quantum of fish seed available for culture. The present estimates for fish seed production from major fish seed production states of India are 11,736 million fingerlings and 26,276 million fry (NFDB, 2011). Inland fishery sector requires around 30 thousand million seeds mainly of freshwater finfishes like carps and freshwater prawns. Similarly brackish water sector need seeds of P.monodon and other crustaceans. Brackishwater sector is looking for alternative species for culture because of the wide spread disease incidence in shrimp farming. Recently the demand for the seed of quality marine/brackishwater species like seabass, etroplus, cobia, mullets etc have increased mainly as an alternative species to prawn in brackishwater aquaculture system. Development of technologies and facilities are to be taken up on a priority basis to ensure an adequate supply of seeds for both freshwater and brackishwater/marine sector.

There are also concerns about the quality of seed used for culture. Demand for improved varieties of seed for both fresh water and brackishwater species in terms of growth and disease resistance are increasing. In freshwater aquaculture scenario, improved varieties of rohu has increased production considerably and similar effort in the case of other species are also required. Development of improved varieties using various biotechnological tools is also needed in the ornamental fish sector.

Conservation

India is one among the 12 mega-biodiversity countries and 25 hotspots of the richest and highly endangered eco-regions of the world. Climatic and environmental changes, overexploitation, habitat loss, inadequate regulatory and conservation regime, and various other anthropogenic activities are among the major causes of species loss that, according to certain estimates, is of the order of a species per day. Regulating fishing pressure, replenishment of native stocks through ranching programmes, improvement of fish breeding grounds and habitat restoration by installation of artificial reefs and Fish Aggregating Devices and development of 'Aquatic Bio reserves' are to be undertaken to conserve biodiversity. Ex situ conservation of fish germplasm and bio inventorying resources must also require greater attention.

Disease surveillance

Outbreak of diseases in aquaculture farms and natural water bodies leads to loss of stock and economic loss. Strong surveillance network on horizontal spread of disease would help to make preventive measures to control diseases. Data collection on seasonal disease outbreaks would help to workout preventive measures to save stocks. Establishment of 'Aqua clinics'

which have unified protocols for identifying disease causing organisms, can provide services to farmers on diagnosis and remedial measures.

Infrastructure

Many fishing harbours are operating in unhygienic condition leading to erosion of fish quality and loss of fish. Owing to overcrowding of fishing boats, poor management and maintenance of fishing harbour infrastructure in the country, the fish hygienic conditions and sanitation standards have met with all-time ebb and being severely criticized by the fish importing countries. It is imperative that the hygienic condition of the harbours need to be improved taking into consideration the issues in each harbour.

Ice plants, chilled storage and fish freezing/processing units facilitate in effectively preserving fish catch, reduction of wastage and preservation of fish against spoilage. These units also help in maintaining minimum price to fishermen by controlling the supply in market and preventing price crash due to glut. It would also help in effective preservation of fish quality as per international standards and help in increase of domestic and export market. Post-harvest fishery activities including processing, product development, transport and marketing provide greater employment than the harvesting sector. The post-harvest loss in marine fisheries sector is accounting more than 20 per cent of its landings due to lack of cold chain from the point of fishing, transport, storage and marketing.

Value Addition

India was recognized as the raw material supplier till early nineties. But, due to interventions and different plans, particularly in form of MPEDA, the fish processing and value addition has got momentum both in quantity and composition. But scope still exists for bringing more and more fishery products under the umbrella of value addition. Considering the stagnant marine and inland capture fish production, thrust may be given for value addition during the XII Plan period. Research and Development and popularization of value added products for domestic and export markets have to be strengthened.

On par with Agriculture

Indian fisheries sector has been growing steadily from the first plan onwards with the annual fish production of 0.754 million tonnes during 1950-51 to the level of 9.57 million tonnes during 2012-13. The GDP of fisheries sector reached at Rs. 78,000 crores during 2012-13 from about Rs. 9000 crores during 1993-94. Currently, fisheries contribute 0.75per cent to national GDP of the country and 4.56 per cent of agricultural and allied activities. The fisheries sector in India is associated with the poor, illiterate and under nourished populations belonging to one of the economically weakest sections of the society. The sector immensely caters to the country's protein requirement and registered highest export earnings growth rate among agriculture commodities. This sector deserves greater support from the government in form of the incentives/concessions as in agriculture. It is matter of concern that aquaculture is being treated as a commercial activity and concessions extended to agriculture are not extended to aqua farmers. This results in increase of tax burden on farmers and higher tariff for power. Hence aquaculture needs to be treated on par with agriculture with regard to bank finance, power tariff, income tax, subsidy on inputs, transportation etc.

Policy

Though most of the policies are focusing on the welfare measures of the fisherfolk, there is a need to implement policies related to sustainability and conservation of resources. Fisheries and aquaculture are multi-stakeholder activities and is a state subject, it is necessary to develop a broad framework for harmonizing various acts under which fisheries is administered. Revision of existing Marine Fisheries Regulation Act (MFRA) and inland model bill, uniform leasing policies for open water bodies including marine and inland waters, treating fisheries on par with agriculture in tariff rates for electricity and water, fright charges, crop insurance for aquaculture, are to be considered. A national mariculture policy is to be formulated to support and encourage the management of the nation's marine resources. Well formulated and implemented policies are vital in the effective implantation of various programmes and thereby contributing to the overall growth of the country.

Capacity strengthening

The fish production and productivity is directly related to the level of skills of the fishers and fish farmers. One of the major reason behind the low productivity of both inland and marine waters for aquaculture and fisheries is low technical know how with the fisher community and even at the level of State Department of Fisheries (DoFs). Therefore, capacity building and skill development were the two issues greatly addressed under XI plan. Large number of stakeholders was trained on different technologies. The interactions among the fishers, state department personnel and research institutions have increased. But, much is needed to be done.

The poor staff strength in DoFs is another important constraint affecting the performance of the departments and efficiency of the sector as a whole. With increase in the work load and diversity, the departments should be strengthened to have better results.

Background and Objective

Literacy, income and health are interlinked for overall development of the personality of an individual and development of the society. Education gives respect and value to an individual in a society and is graded high among the population especially in rural communities. Education is a basic right for all human beings and an essential prerequisite for infusing self-confidence, reducing poverty, improving living conditions and building a food-secure world. The Government of India has placed education at the centre of the 11th Five Year Plan and regarded it as India's Education plan. The government places highest priority on education as an instrument for achieving rapid and inclusive growth. It presents a comprehensive strategy for strengthening the education sector covering all segments of education pyramid. (Singh, 2007).

Literacy is the ability to identify, understand, interpret, create, communicate and compute using printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve his or her goals, developing his or her knowledge or potential and participate fully in the community and wider society. (UNESCO Institute for Education, 2003).Literacy is a key aspect of human resource development (HRD) enabling people's livelihoods and capabilities, influencing their access to information and

resources and capacity to manage change. Literacy can help to reduce social marginalization and vulnerability faced by many small-scale fishing communities enhancing effective social participation, influencing people's access to rights and entitlements. (FAO, 2006).Globally there are about 771 millions aged 15 and above, without basic literacy skills. Out of this, 130 million are in South-east Asia, 381 million are in South west Asia and 511 are in Asia and Pacific. (UNESCO, 2006).

Literacy and numeracy are integral to the livelihoods of many small-scale fishing communities. Despite the educational marginalization faced by many fishing communities, there appear to be rich cultures of literacy with often-high levels of motivation for functional literacy learning. Fishing communities often face educational disadvantage due to geographical and social marginalization. (FAO, 2006).

In India, there is lack of a comprehensive data base on the literacy level of the fisher folk. The National Maine Fishery Census (2005) had estimated the literacy level of the head of the family only and not that of the family. The data collected by the National Sample Survey Organization (55th round) shows that men's literacy rates within fishing communities are higher than those of agricultural labourers. Past studies showed that in Kerala, India, literacy rates in coastal fishing communities were 78 per cent, with women higher than men - figures comparable with other rural communities. On the other hand, in Orissa, figures suggest that fishing communities have much lower rates of literacy than agricultural communities, particularly among women. However these data are collected for isolated location specific studies and there is lack of a comprehensive national data base on literacy.

Income of the household is an important indicator of the socio economic status in a community. The fisheries sector in India has undergone rapid changes over the last six decades to develop from a sustenance fishing to the status of a multi-crore fishing industry. However the economic and social benefits associated with this transformation have not trickled down to the grass root level of the Indian fishing community. The income distribution in the sector is highly skewed in favor of the mechanized sector, which controls over 70 per cent of the total fish landings, though they account for only 30 per cent of the fishing community. The per capita area available per fishermen is gradually declining over the years. The per capita earnings also vary among the fishermen working in the three different sectors of the fishery.

Assessment of health status of fishing communities is very important. There are many factors that influence people's health. These factors are often interactive and outside the individual's control. An unhealthy condition in a family has psychological and economic impact not only on the concerned individual but also on the entire household. An UNICEF study has estimated that in Cote d' Vlains, in urban households, the family which lost one member due to AIDS, have their income reduced by 52-67 per cent, while their expenditure increased four folds. In India, the weak, marginal section of the society is vulnerable to all sorts of health hazards including TB, lung and skin infection, AIDS, cancer and related ailments. The small and marginal section of the fishing community, which lies in the bottom of the socio economic strata, is no exception to this.

Very limited information is available regarding the health and nutritional status of the fisher folk in general and the fisher household in particular. The National Agricultural Technology Project (NATP) study on the socio economic condition of the fisherwomen in

the coastal ecosystem of Andhra Pradesh, Tamilnadu, Kerala and Karnataka has assessed the nutritional and health status of the fisherwomen and preschool children and graded them under different degrees of malnutrition.

Among the recent ailments, HIV/AIDS has become an epidemic spreading across the world and it is estimated that 10 per cent of the global AIDS affected population is in South Asian countries. A few studies have documented the incidence of AIDS in fishing community especially where large scale migration of fishermen is observed. (SIFFS, 2004). Besides the fight against such ailments need a systemati data base of the health status of the target group.

Thus in light of the above discussion, it is observed that presently there is a lack of a comprehensive data base on the literacy, income and health status of the fisher folk in India. These three parameters are the building blocks of the pyramid of socio- economic development of the community. Hence the present project is proposed to assess the literacy, income and health status of the fisher folk in India to develop a strong data base for the use of administrators, policy makers, researchers and academicians.

Objective

The objective of the research study is to assess the status of literacy, health and income of marine and inland fishers, fish farmers and workers in allied activities both in capture and culture systems

Methodology

Sampling design

The entire fishing arena was divided into marine and inland sectors and further classified into capture and culture sub sector. The distribution of samples for the entire study will be as follows

Table 1.2 Distribution of sample respondents in marine fisheries sector.

Sl.No.	Sub sector	Details	Sample Size
1.	Capture	Rural households from all maritime states	700
		Urban households from all maritime states	700
2.	Mariculture	Andhra Pradesh, Kerala, Karnataka, Maharashtra ,Goa and Gujarat	400
3.	Total		1800

Table 1.3 Distribution of sample respondents in fresh water aquaculture sector

Sl.No.	Sub-sector	Details	Sample size
1.	Ponds and tanks a) Extensive	Assam	100
		West Bengal	100
		Orissa	100
		Tamilnadu	100
	b) Semi-intensive & intensive	Andhra Pradesh	50
		Punjab	50
2.	Total		500

Table 1.4 Distribution of sample respondents in inland fisheries sector

Sl.No.	Sub-sector	Details	Sample size
1.	Reservoirs a) Small reservoirs b) Medium reservoirs c) Large reservoirs	Tamil Nadu	50
		Kerala	50
		Madhya Pradesh	50
		Jharkhand	50
		Uttar Pradesh	50
		Andhra Pradesh	50
		Madhya Pradesh	50
		Himachal Pradesh	50
2.	Wetlands	Assam	50
		West Bengal	50
		Bihar	50
3.	River	Ganga :Uttar Pradesh	50
		Brahmaputra : Assam	50
		Narmada : Madhya Pradesh	50
		Gujarat	50
		Krishna Andhra Pradesh	50
4.	Estuary	Hoghly-Matlah West Bengal	50
		Narmada: Gujarat	50
5.	Brackishwater	Lake Chilka-Orissa	50
		Lake Pulicat-Tamilnadu	50
		Brackishwater: Vembanad	50
6.	Cold water	Uttarakand	50
7.	Total		1,100

Table 1.5 Distribution of sample respondents in brackishwater aquaculture sector

Sl.No.	Sub-sector	Details	Sample size
1.	Extensive	West Bengal	100
		Kerala	100
2.	Improved extensive	Andhra Pradesh	100
		Gujarat	100
		Tamilnadu	100
3.	Total		500

Table 1.6 Distribution of sample respondents in allied sector

Sl.No.	Sub-sector	Details	Sample size
1	Processing sector	Kerala, Gujarat, Andhra Pradesh and Maharashtra	200
2	Marketing	Kerala, Gujarat, Andhra Pradesh, Maharashtra, Delhi, Punjab, West Bengal and Madhya Pradesh	400
3	Total		600

Data Collection

The data was collected with the pre-tested schedule (given in Annexure-I) from the selected sample respondents giving due representation for different regions and fishery activities. The state-wise and institute-wise sample distribution is given in table 1.7.

Table 1.7 State wise breakup of sample respondents under different categories

Sl. No.	State	Marine	Inland	Fresh water aquaculture	Brackish water aquaculture	Processing and Marketing	Total
1.	West Bengal	140	100	100	100	50	490
2.	Orissa	140	50	100	0	0	290
3.	Andhra Pradesh	190	100	50	100	100	540
4.	Tamilnadu	140	100	100	100	0	440
5.	Puduchery	140	0	0	0	0	140
6.	Kerala	265	100	0	100	100	565
7.	Karnataka	215	0	0	0	0	215
8.	Goa	190	0	0	0	0	190
9.	Maharashtra	190	0	0	0	100	290
10.	Gujarat	190	100	0	100	100	490
11.	Jharkhand	0	50	0	0	0	50
12.	Madhya Pradesh	0	150	0	0	50	200
13.	Bihar	0	50	0	0	0	50
14.	Assam	0	100	100	0	0	200
15.	Delhi	0	0	0	0	50	50
16.	Himachal Pradesh	0	50	0	0	0	50
17.	Punjab	0	0	50	0	50	100
18.	Uttarakand	0	50	0	0	0	50
19.	Uttar Pradesh		100	0	0	0	100
20	Total	1,800	1,100	500	500	600	4,500

Tools of Analysis

Conventional tools of analysis will be employed to process the data and bring out the literacy, income and health status of the fishers in India. Appropriate econometric tools will be employed to study the relation between different parameters of the socio economic profile within and across the systems.

Period of Study

The study was conducted during the period from November 2009- March 2011.

Activity milestones

1. Identification of sample states and districts / Sample size for the study
2. Preparation of database on secondary sources of information on the parameters

3. Finalization of questionnaire
4. Data collection work
5. Visit the data collection centers by co-coordinators
6. Mid term review workshop by Principal Coordinator on the progress of work and development of standard dummy tables across sectors
7. Dispatch of data sheets as decided in the mid-term review meeting
8. Compilation of data as decided in the mid-term review meeting
9. Centralization of tabulated data on excel sheets / draft reports on specific sectors with Principal Coordinator
10. Submission of reports by the Coordinators to the Principal Coordinator
11. Compilation and finalization of report by the Principal Coordinator
12. Submission of draft final report to SMD
13. Review meeting of the draft final report and finalization of the Report
14. Submission of the final report to DAHDF

The final report is presented below. The organization of the report is as follows

Budget

The total budget allocated was Rs. 13.68 lakhs apportioned across field survey (Rs. 6.08 lakh) TA (4.60) and other contingency (3.00 lakhs)

Marine Capture Fisheries 02

02

Marine Capture Fisheries

Shyam. S. Salim, R. Narayanakumar, Pradeep Katiha, M. Krishnan, Nagesh Barik, Nikitha Gopal, R.S. Biradar, Arpita Sharma and K. Ponnusami

Settings

India contributes significantly to the marine fish production of the country sharing 42.29 per cent of the production and has a comparatively higher marine fisheries resources comprising of a coastal belt of 6068 kms passing through 3388 fishing villages and 1511 landing centres across 9 coastal states and two union territories. Total marine fisherfolk population was about 4 million comprising in 864,550 families. About 38 per cent of marine fisherfolk were engaged in active fishing in which 85 per cent are having full time engagement. In this study, sample states were selected from both east and west coasts of India comprising of Kerala, Karnataka, Goa, Maharashtra and Gujarat from west coast, and Tamil Nadu, Andra Pradesh, Orissa, West Bengal and Puduchery (UT) from the latter, to assess the literacy, health and income status of marine fisherfolk in India. The study covered 1800 respondent households and was selected by random sampling method from the selected districts. The study covered the different sectors viz., mechanized, motorized and traditional sectors.

The results and discussions are presented under the following heads:

A. General particulars
B. Literacy status
C. Health status
D. Income status

A. General particulars

The general particulars of respondent's households included age, family size, family composition etc.

(i) Age distribution

The age distribution of respondent households are given in Table 2.1

Table 2.1: Age distribution of the sample respondents (years)

Sl.No.	State	<35	36-55	>56	Total
1.	Andhra Pradesh	75 (17.61)	105 (11.85)	70 (20.77)	250 (15.16)
2.	Goa	8 (1.88)	80 (9.03)	65 (19.29)	153 (9.28)
3.	Gujarat	70 (16.43)	60 (6.77)	10 (2.97)	140 (8.49)
4.	Karnataka	12 (2.82)	76 (8.58)	52 (15.43)	140 (8.49)
5.	Kerala	10 (2.35)	88 (9.93)	42 (12.46)	140 (8.49)
6.	Maharashtra	74 (17.37)	171(19.30)	18 (5.34)	263 (15.92)
7.	Orissa	67 (15.73)	53 (5.98)	22 (6.53)	142 (8.61)
8.	Puduchery	49 (11.50)	83 (9.37)	8 (2.37)	140 (8.49)
9.	Tamil Nadu	43 (10.09)	83 (9.37)	14 (4.15)	140 (8.49)
10	West Bengal	18 (4.23)	87 (9.82)	36 (10.68)	141 (8.55)
11.	Total	425(100.00)	886(100.00)	337(100.00)	1649(100.00)

Figures in parenthesis indicate percentage to total

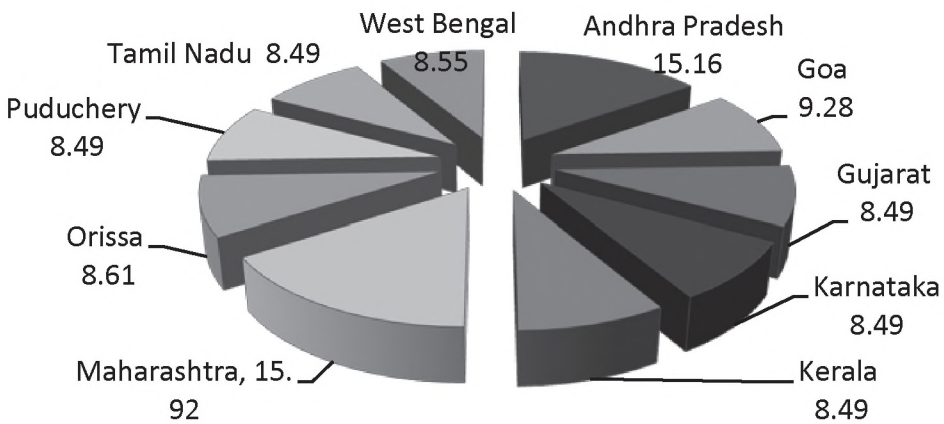


Fig 2.1. Age distribution of respondent households

(ii) Family composition

The family composition of the respondents is indicated in Table 2.2

The results indicate shrinking male-female ratios in urban and rural households.

Table 2.2. Family composition of the respondent households –Male and Female (Number)

Sl. No.	State	Households	Male	Female	Total	Male - Female Ratio
1.	Andhra Pradesh	250(15.16)	507(12.82)	494(13.84)	1001(13.84)	1.03
2.	Goa	153(9.28)	370(9.36)	349(9.78)	749(9.92)	1.06
3.	Gujarat	140(8.49)	396(10.02)	314 (8.80)	710(9.40)	1.26
4.	Karnataka	140(8.49)	330(8.35)	331(9.27)	661(8.75)	1.00
5.	Kerala	140(8.49)	390(9.86)	346(9.69)	736(9.74)	1.13
6.	Maharashtra	263(15.92)	617(15.60)	587(16.44)	1204(15.94)	1.05
7.	Orissa	142(8.61)	347(8.78)	284(7.96)	631(8.35)	1.22
8.	Puduchery	140(8.49)	318(8.04)	282(7.90)	600(7.94)	1.13
9.	Tamil Nadu	140(8.49)	307(7.76)	289(8.10)	596(7.89)	1.06
10.	West Bengal	141(8.55)	372(9.41)	294(8.24)	666(8.82)	1.27
11.	Total	1649(100.00)	3954(100.00)	3570(100.00)	7554(100.00)	1.11

Figures in parenthesis indicate percentage to total

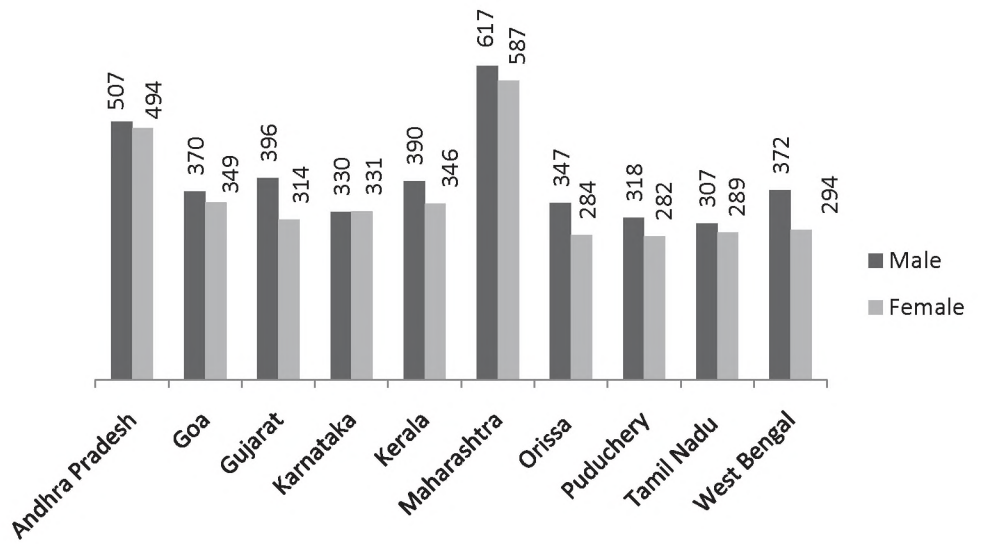


Fig 2.2 Family composition of the respondent households

(iii) Family size

Family sizes of the respondent households are given in Table 2.3. The small family norm is mostly adopted by the fisher households of India. The average size of family in India worked out to be 4.56 ranging from 3.78 in Andra Pradesh to 5.25 in Kerala. It is interesting to note that 51 per cent of the fisher households in India is housing 2-4 members and hardly 12 per cent of households are having more than 7 members in the family. There exist only minor differences in the family size across the states which indicate the popularization of the small family norms across the states.

Table 2.3 Family size of the respondent households (Number)

Sl. No.	States	2-4	5-6	7-10	>10	Total	Average family size
1.	Andhra Pradesh	162 (19.2)	84 (13.35)	4 (2.22)		250(15.1)	3.78
2.	Goa	66 (7.86)	73 (11.61)	14 (7.78)		153(9.28)	4.66
3.	Gujarat	51 (6.07)	63 (10.02)	26(14.44)		140(8.49)	5.06
4.	Karnataka	68 (8.10)	50 (7.95)	22(12.22)		140(8.49)	4.74
5.	Kerala	64 (7.62)	46 (7.31)	30(16.67)	3 (10.00)	140(8.49)	5.25
6.	Maharashtra	99 (11.79)	123 (19.55)	41(22.78)	23(76.67)	263(15.9)	4.58
7.	Orissa	79 (9.40)	47 (7.47)	16 (8.89)		142(8.61)	4.28
8.	Puduchery	88 (10.48)	49 (7.79)	3 (1.67)	3 (10.00)	140(8.49)	4.28
9.	Tamil Nadu	89 (10.60)	43 (6.84)	8 (4.44)	0 (0.00)	140(8.49)	4.25
10.	West Bengal	74 (8.81)	51 (8.11)	16 (8.89)	1 (3.33)	141(8.55)	4.72
11.	Total	840(100.00)	629(100.00)	180 (100)	30(100.0)	1649(100)	4.56

Figures in parenthesis indicate percentage to total

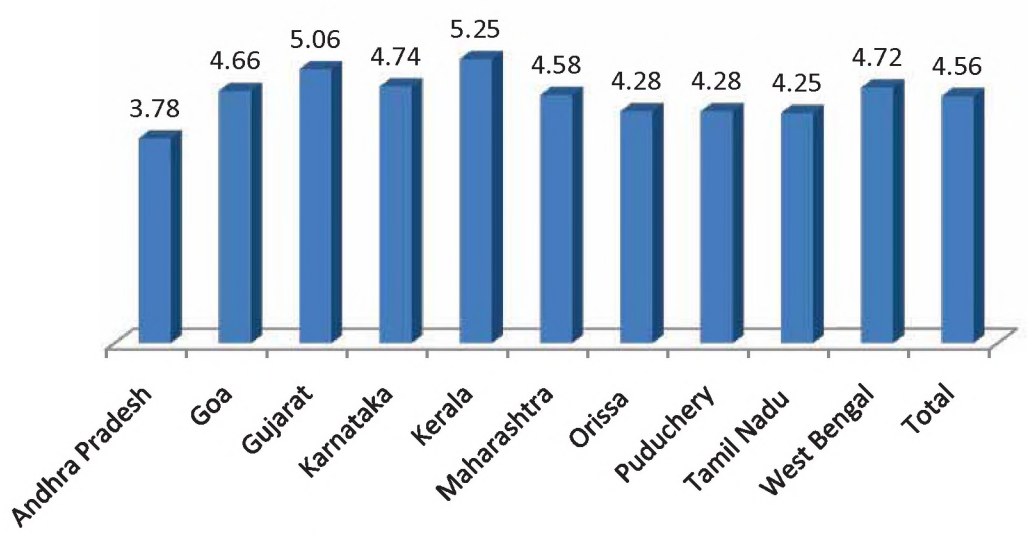


Figure 2.3 Family size of respondent households (Number)

(iv) Age composition

The classification of fisher population as adults (above 15 years) and children (less than 15 years) are given in Table 2.4.

The male – female ratio of the adult group (>15 years) was found to be 1.06:1.00 whereas the same for the children (<15 years) was found to be 1.21:1.00. Adult females in the age group of above 15 year outnumber the males in Goa and Karnataka. Otherwise in all other states males outnumber the females perhaps justifying the common notion preference of males to females in the coastal areas. It is also significant to note that that the younger generation of children is almost represented mostly by males over female.

The dependency ratio was found to be 1:2.43 for the total sample whereas in Goa, Maharashtra and Karnataka it was found to be highest with a rate of 4.57, 4.84 and 5.01 respectively (figure 2.4). The number of children outnumbers the adults only in the case of Andrapradesh with a ratio of 1:0.99. The results clearly indicate that changing paradigms of family size in Indian states.

Table 2.4 Age composition of the respondent households (Number)

Sl. No.	State	Adult (> 15 years)		Children < 15 years)		Total	
		Male	Female	Male	Female	Male	Female
1.	Andhra Pradesh	247(9.09)	229(8.92)	260(21.78)	220(22.36)	507(12.97)	449(12.63)
2.	Goa	289(10.64)	296(11.53)	73(6.11)	55(5.59)	362(9.26)	351(9.87)
3.	Gujarat	237(8.72)	195(7.60)	156(13.07)	119(12.09)	393(10.05)	314(8.83)
4.	Karnataka	272(10.01)	279(10.87)	58(4.86)	52(5.28)	330(8.44)	331(9.31)
5.	Kerala	305(11.23)	272(10.60)	85(7.12)	72(7.32)	390(9.98)	346(9.73)
6.	Maharashtra	501(18.44)	497(19.36)	116(9.72)	90(9.15)	617(15.78)	587(16.51)
7.	Orissa	194(7.14)	174(6.78)	151(12.65)	109(11.08)	343(8.77)	283(7.96)
8.	Puduchery	214(7.88)	183(7.13)	104(8.71)	99(10.06)	318(8.14)	282(7.93)
9.	Tamil Nadu	216(7.95)	210(8.18)	91(7.62)	76(7.72)	307(7.85)	289(8.13)
10.	West Bengal	242(8.91)	232(9.04)	100(8.38)	92(9.35)	342(8.75)	324(9.11)
11.	Total	2717(100)	2567(100)	1194(100)	984(100)	3909(100)	3556(100)

Figures in parenthesis indicate percentage to total

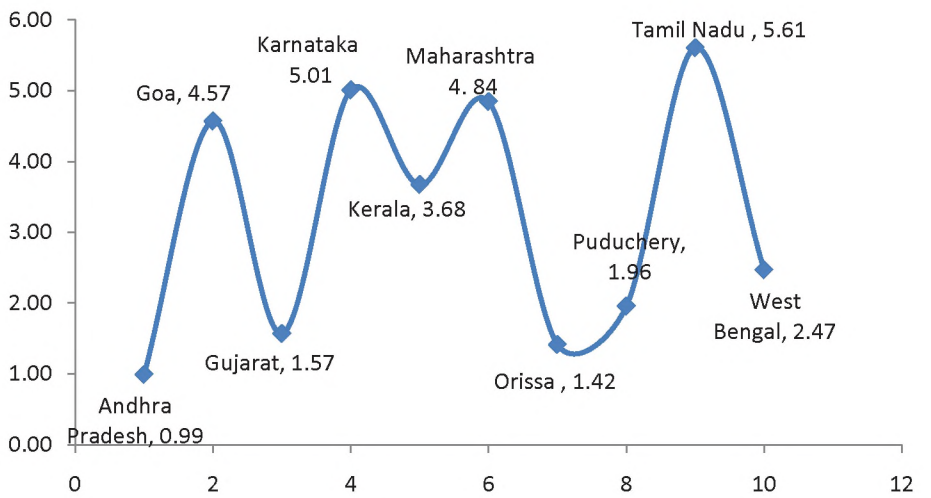


Figure 2.4 Dependency Ratio

B. Literacy status

The literacy status of the respondent households was analysed through the literacy level, educational status – continuing and dropouts and access to educational facilities. The illiterate indicates fisherfolk without any formal education and does not even possess functional literacy.

(i) Literacy status of sample respondent households

The literacy status includes the level of education as indicated by primary, secondary and collegiate. The primary level indicated schooling till fourth grade, secondary level indicated by high school, secondary and vocational education. The collegiate level of education was denoted by college and professional education.

The general literacy rate of India was 73.52 per cent (Census-2001) against the literacy rate of 77.01 per cent among the fisherfolk. The results indicate that among the literates, 30.55 per cent have primary level of education, 56.69 per cent have secondary level of education and hardly 12.77 per cent have collegiate level of education. The person with collegiate education was more in Karnataka and Goa. The overall literacy rate for the total sample fisherfolk was found to be 77.01 per cent which is slightly higher than the state average.

The highest literacy rate of fishers (95.01%) was obtained in Kerala followed by Karnataka (91.71%) and Puduchery (90 %) . The lowest literacy rate of fishers was found in AP (48.55 %)

Table 2. 5 Literacy Status of respondent households (Number)

Sl. No.	States	Total	Illiterate	Literate	Primary Level	Secondary Level	Collegiate Level	Literacy rate
1.	Andhra Pradesh	1001 (13.37)	515 (34.24)	486 (8.43)	237 (13.46)	217 (6.64)	32 (4.35)	48.55
2.	Goa	713 (9.52)	115 (7.65)	598 (10.37)	127 (7.21)	395 (12.09)	76 (10.33)	83.87
3.	Gujarat	707 (9.44)	143 (9.51)	491 (8.52)	274 (15.56)	209 (6.40)	8 (1.09)	69.45
4.	Karnataka	661 (8.83)	13 (0.86)	628 (10.89)	158 (8.97)	321 (9.82)	149 (20.24)	95.01
5.	Kerala	736 (9.83)	37 (2.46)	675 (11.71)	143 (8.12)	489 (14.96)	43 (5.84)	91.71
6.	Maharashtra	1204 (16.08)	134 (8.91)	1070 (18.56)	150 (8.52)	551 (16.86)	369 (50.14)	88.87
7.	Orissa	602 (8.04)	277 (18.42)	325 (5.64)	255 (14.48)	67 (2.05)	2 (0.27)	53.99
8.	Puduchery	600 (8.01)	26 (1.73)	540 (9.37)	125 (7.10)	395 (12.09)	20 (2.72)	90.00
9.	Tamil Nadu	596 (7.96)	43 (2.86)	524 (9.09)	109 (6.19)	389 (11.90)	27 (3.67)	87.92
10.	West Bengal	666 (8.90)	201 (13.36)	428 (7.42)	183 (10.39)	235 (7.19)	10 (1.36)	64.26
11.	Total	7486 (100)	1504 (100)	5765 (100)	1761 (100)	3268 (100)	736 (100)	77.01 (100)

Figures in parenthesis indicate percentage to total

(ii) Educational profile

The information on education of the respondents in terms of continuance and discontinuance of education would provide the scope of employment opportunities, possible migration, and alternative avocation of the sample households. Thus continuing - dropout ratios were calculated among the respondent households across the sample states.

The dropouts were more at secondary level of education with 54.76 per cent ranging from 3.67 per cent in Maharashtra to 24.40 per cent in Kerala (Table 2.6). The dropouts at primary level of education were about 31.05 per cent ranging from 0.22 per cent in Maharashtra to 26.42 per cent in Andra Pradesh. The highest number of dropouts at collegiate level was from Maharashtra (39.48 per cent) followed by Puduchery and Andra Pradesh with 14.16 per cent and 13.73 per cent respectively. The continuing to dropout ratio, which indicates a parameter

Table 2.6 Educational status of respondent households - Continuing and Dropout Number)

Sl. No.	States	Continuing	Drop outs			
			Primary	Secondary	Collegiate	Total
1.	Andhra Pradesh	486(23.18)	237(26.42)	217(13.72)	32(13.73)	486(16.82)
2.	Goa	143(6.82)	11(1.23)	72(4.55)	15(6.44)	98(3.39)
3.	Gujarat	106(5.05)	94(10.48)	82(5.18)	4(1.72)	180(6.23)
4.	Karnataka	69(3.29)	48(5.35)	112(7.08)	27(11.59)	205(7.10)
5.	Kerala	189(9.01)	93(10.37)	386(24.40)	7(3.00)	486(16.82)
6.	Maharashtra	324(15.45)	2(0.22)	58(3.67)	92(39.48)	152(5.26)
7.	Orissa	142(6.77)	121(13.49)	86(5.44)	3(1.29)	210(7.27)
8.	Puduchery	288(13.73)	115(12.82)	164(10.37)	33(14.16)	312(10.80)
9.	Tamil Nadu	191(9.11)	32(3.57)	297(18.77)	8(3.43)	337(11.66)
10.	West Bengal	159(7.58)	144(16.05)	108(6.83)	12(5.15)	423(14.64)
11.	Total	2097(100)	897(100)	1582(100)	233(100)	2889(100)

Figures in parenthesis indicate percentage to total

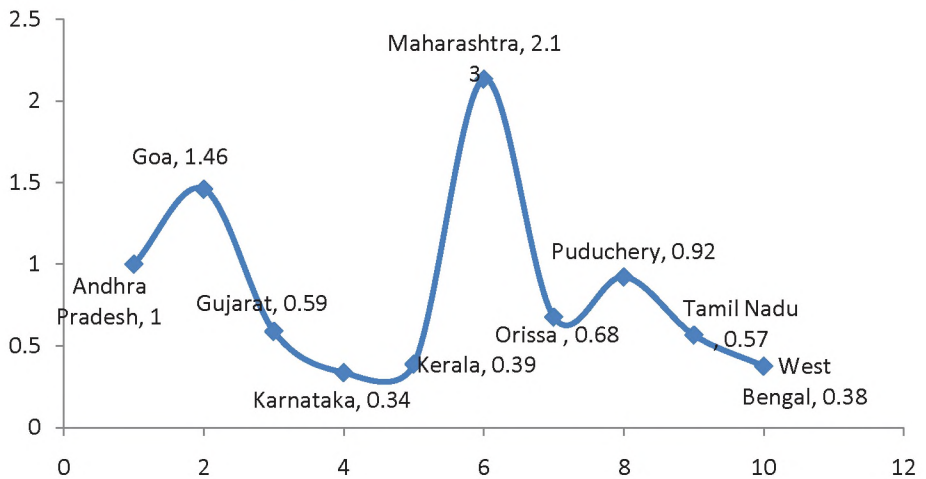


Figure.2.5 Continuing Dropouts ratio among respondent households

on increasing education was found to be the highest in Maharashtra, Goa and Andra Pradesh with 2.13, 1.46 and 1 respectively (Figure 2.5). The highest number of dropouts was observed in Andra Pradesh and Kerala with 16.82 per cent each and among the dropouts highest number accounted during primary level in Andrapradesh and secondary level in Kerala. Alternative source of livelihood, possibility of seeking employment in fisheries enterprises, scope of labour etc. can be the reasons for the increasing dropouts among these states.

(iii) Access to educational institutions

Access to education is an important yardstick to measure the socio-economic well-being of a society. The proximity of the educational institutions like primary school, high school, college and professional college provides a major impetus when it comes to continuing education. That was something the fisherfolk were said to be denied earlier which was disproved by this analysis.

The access to education was analysed by finding the distance to nearby educational institutions. The average distance from fishing villages to nearby primary, high school, college and professional institution are given in (Table 2.7). As a whole the average distance to a primary school in India is calculated to be 1.05 km from fishing villages of the selected states. Similarly, high schools are at 2.59 km, colleges are at 8.00 km, and professional institutions are at 12.44 km, apart from fishing villages in India. (Figure 2.6 b)

The average distance to primary school ranges from 2.1 km in Orissa to 11.72 km for Gujarat (Figure 2.6.a). The distance for high schools ranges from 1.8 km for Orissa district to 4.00 km for Andra Pradesh. With regards to colleges average distance ranges from 3.6 km for Orissa to 16.15 km for Goa. The average distance for professional institution ranges from 5 to 24.4 km among different states. The results very clearly indicated the reasons for growing literacy among the fisherfolk. Hence it is true that the improved or increased access to educational facilities has helped to increase the literacy level of the fisherfolk.

Table 2.7: Access to Education (km)

Sl. No.	States	Primary School	High School	College	Professional College
1.	Andhra Pradesh	1.00	4.00	4.00	5.00
2.	Goa	2.16	3.25	16.15	20.2
3.	Gujarat	0.89	3.2	18.4	24.4
4.	Karnataka	1.78	2.37	4.85	12.75
5.	Kerala	1.33	2.33	6.38	12.19
6.	Maharashtra	0.8	1.9	4.78	11.3
7.	Orissa	0.2	1.8	3.6	2.8
8.	Puduchery	1.1	3.12	7.65	9.5
9.	Tamil Nadu	0.52	1.76	3.97	15.91
10.	West Bengal	0.7	2.13	10.21	10.36
11.	Average	1.05	2.59	8.00	12.44

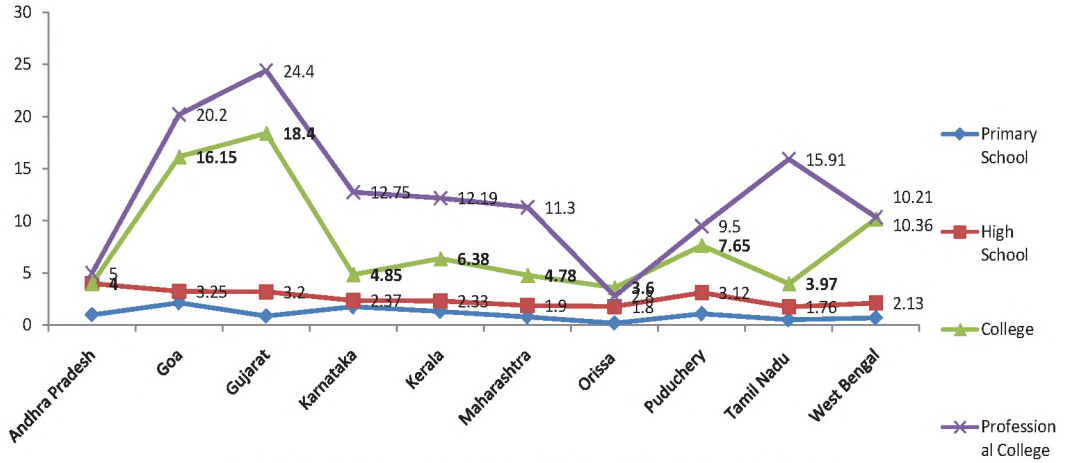


Fig 2.6 a) Access to educational institutions - Distance in km

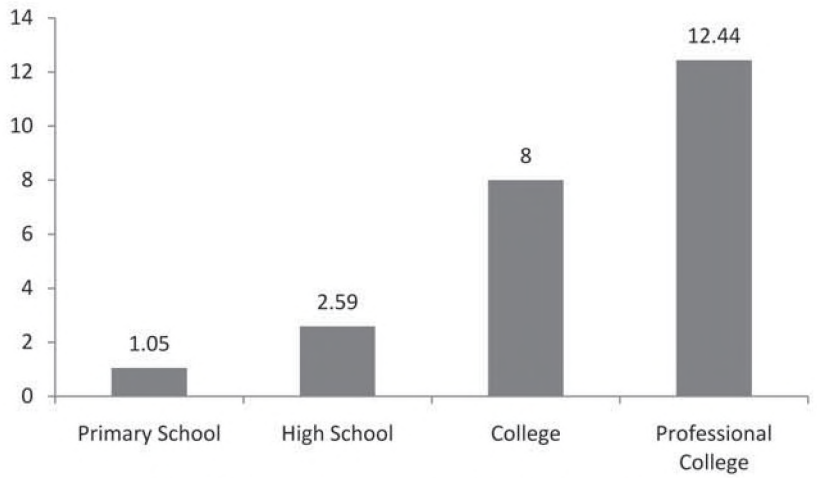


Fig 2.6 b) Access to educational institutions - km

C. Health status

The average life expectancy of people in the state is worked out at 65.5 years ranging from 62.8 years for male to 68.2 years for female. The health status of the respondent households was studied based on the parameters like administration of vaccines, incidence of discontinuation, birth weight of infants, incidence of maternal and child mortality at the time of birth, incidence of common diseases and special ailments among adults and children. Disease management aspects like access to health care, problems in health management and suggestions to improve the health care facilities are also dealt in this session.

(i) Vaccination regime of infants / children (less than 15 years)

The average age of administration of vaccination and incidence of discontinuation among infants / children with age less than 15 years in the selected coastal states of India is furnished in (Table 2.8). The vaccination for Pox, BCG, MMR and Polio were regularly taken by all the respondent families.

The average age at which the vaccination for pox was given to the child worked out at 1.05 years ranging from 0.75 years at West Bengal to 1.31 years at Goa. The BCG was administered at 2.62 years ranging from 0.09 years at Maharashtra to 10.1 years each at Gujarat and Karnataka. The average age for administering MMR was 2 years which varies from 0.99 years at Kerala to 1.87 years at Goa. Polio vaccine was administered at the age of 4.50 years varying from 3.09 at Puduchery to 5 at majority of the states including Andra Pradesh, Goa, Gujarat, Karnataka, Maharashtra, Orissa and West Bengal (Figure 2.7). Normally polio administration continues till the age of 5 years .

Table 2.8: Vaccination regime of infants / children (less than 15 years) – Average age of administration and incidence of discontinuation

Sl. No.	States	Pox		BCG		MMR		Polio		Others	
		Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)
1.	Andhra Pradesh	1.00		1.5		1.00		5	0	0	0
2.	Goa	1.31	0	0.1	0	1.87	0	5	0	0	0
3.	Gujarat	1.00	0	10.1	0	1.00	0	5	0	0	0
4.	Karnataka	1.00	0	10.1	0	1.00	0	5	0	0	0
5.	Kerala	1.03	0	0.18	0	0.99	0	3.34	0	0	0
6.	Maharashtra	1.17		0.09		1.41		5	0	0	0
7.	Orissa	1	19.4	1	19.4	1.00	30.8	5	0	0	3.8
8.	Puduchery	0.97	0	1.01	0	1.00	0	3.09	0	0	0
9.	Tamil Nadu	1.25	0	1.16	0	1.22	0	3.60	0	0	0
10.	West Bengal	0.75	0	1	0	1.5	0	5	0	0	0
11.	Average	1.05		2.62		1.199		4.50		0.10	

**Incidence of Discontinuation (IOD)*

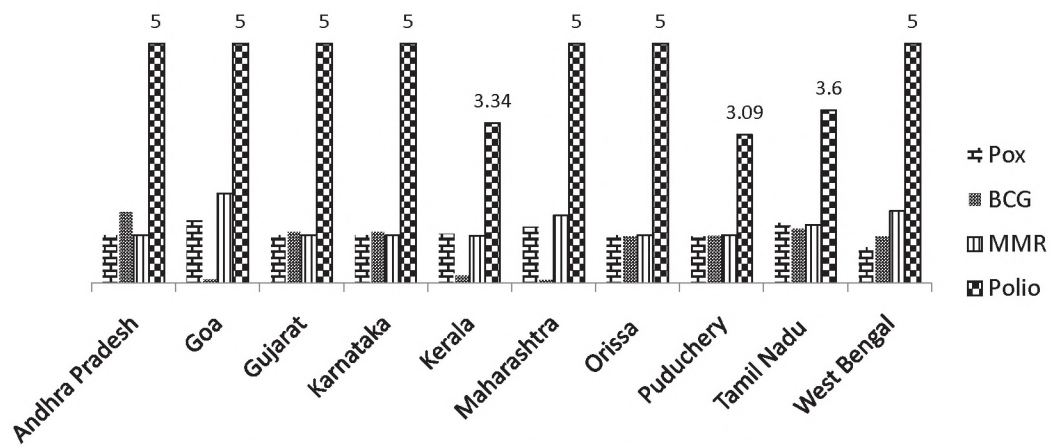


Figure.2.7 Average age of administration of vaccination

The reason for the discontinuation of vaccination regime of infants is given in Table 2.9. The traditional beliefs, lack of awareness about the availability of vaccines, lack of time to access the vaccination, lack of sufficient doses of vaccine at the locality and poor reliability on vaccines provided by government agencies were listed as the reasons for discontinuation of vaccination in the questionnaire. However in India no cases of discontinuation of vaccination among the infants of fisherfolk were reported in majority of the study areas except in Maharashtra. There were 8 cases of discontinuations of vaccinations among the infants of fisherfolk reported in Maharashtra due to the above given reasons.

Table 2.9: Vaccination regime of infants/children - Reason for the discontinuation (Frequency)

Sl. No.	Reasons	AP	GA	GU	KN	KR	MH	OR	PU	TB	WB	TOT
1.	Traditional beliefs	NA	NA	NA	NA	NA	1	NA	NA	NA	NA	1
2.	Lack of awareness about the availability of vaccines	NA	NA	NA	NA	NA	2	NA	NA	NA	NA	2
3.	No time to access the vaccination	NA	NA	NA	NA	NA	1	NA	NA	NA	NA	1
4.	Lack of sufficient doses of vaccine at the locality	NA	NA	NA	NA	NA	3	NA	NA	NA	NA	3
5.	Poor reliability on vaccines provided by government agencies	NA	NA	NA	NA	NA	1	NA	NA	NA	NA	1

(ii) Birth weight of infants

The birth weight of infants in fisher households at selected states is given in Table 2.10. The average birth weight of males was 2.72 kg and female was 2.59 kg. The average weight of male infants ranges from 2.20 kg at Orissa to 3.25 kg at Karnataka and female infants ranges from 1.90 kg at Orissa to 2.98 kg at Puduchery. This is in conformity with the average birth weight of a male and female child in India (Census-2001).

Table 2. 10: Birth weight of infants (kg)

Sl. No:	States	Weight (kg)		
		Male	Female	Total
1.	Andhra Pradesh	2.90	2.50	2.70
2.	Goa	2.52	2.52	2.52
3.	Gujarat	2.45	2.52	2.48
4.	Karnataka	3.25	2.91	3.08
5.	Kerala	2.75	2.64	2.69
6.	Maharashtra	2.57	2.41	2.39
7.	Orissa	2.20	1.90	2.10
8.	Puduchery	2.94	2.98	2.98
9.	Tamil Nadu	2.83	2.65	2.74
10.	West Bengal	2.78	2.86	2.82
11.	Average	2.72	2.59	2.65

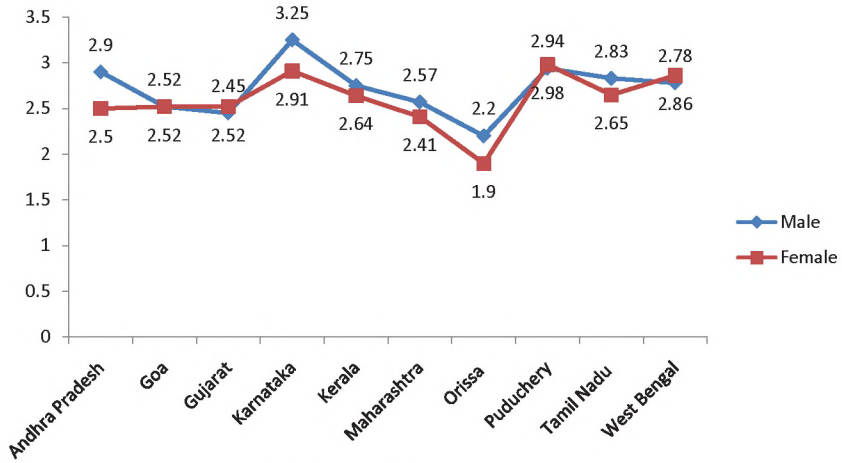


Fig: 2.8 Birth weights of infants (kg)

(iii) Incidence of mortality among mother/ child during birth

Maternal and child mortality at the time of birth and infant mortality had been pressing concerns over the past. The incidence of child mortality was limited to 15 cases among the selected fisher folks of selected states and 3 incidence of maternal mortality also was observed across all the selected respondent fisherfolk. Two cases of maternal mortality were observed in Orissa and one in Gujarat (Table 2. 11). Highest number of child mortality was observed in Orissa (7) followed by Gujarat (4) and Karnataka (3). Generally in India adequate care is being taken now to reduce the incidence of maternal and infant mortality.

Table 2.11: Incidence of mortality among mother/ child during birth (Number)

Sl. No.	States	No of delivery	Mortality of mother/ child during birth				
			Mother	Reason	Child	Reason	Total
1.	Andhra Pradesh	NA	NA	NA	NA	NA	NA
2.	Goa	NA	NA	NA	NA	NA	NA
3.	Gujarat	75	1	NA	4	NA	5
4.	Karnataka	64	NA	NA	3	NA	3
5.	Kerala	19	NA	NA	NA	NA	NA
6.	Maharashtra	1	NA	NA	1	NA	1
7.	Orissa	142	2	NA	7	NA	9
8.	Puduchery	39	NA	NA	NA	NA	NA
9.	Tamil Nadu	38	NA	NA	NA	NA	NA
10.	West Bengal	32	NA	NA	NA	NA	NA
11.	Total	410	3	NA	15	NA	18

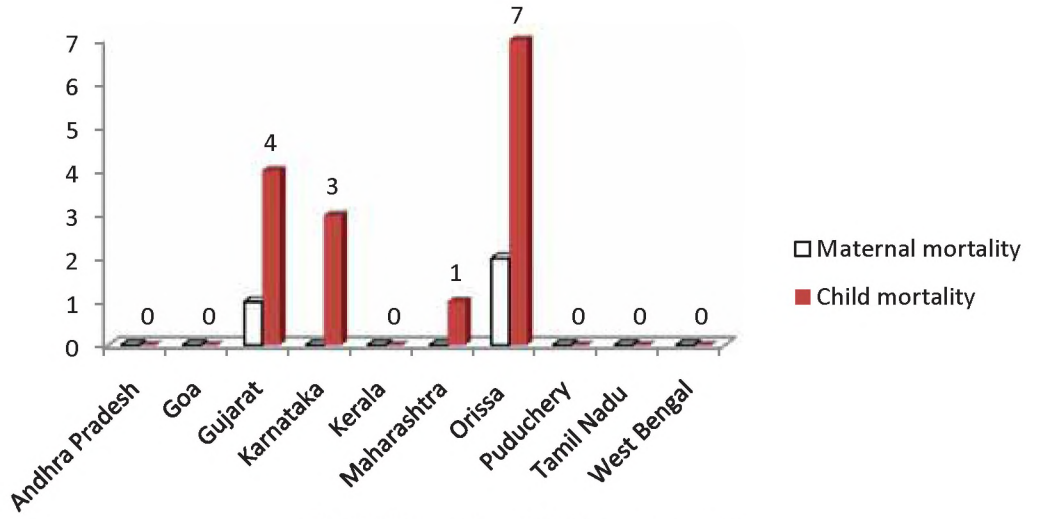


Fig: 2.9 Maternal and Child mortality ratio

(iv) Incidence of diseases among adults

The incidence, frequency, and previous occurrence of diseases among the adult family members of the respondents across the 9 coastal states and one UT are discussed in the Table 2.12A and 2.12B. Major diseases found among the respondents were categorized under two groups, viz; common diseases and special ailments. Fever/flu, body ache, diahorrea, gastroenteric disease, skin disorder, reproductive disorders are included in common diseases. Special ailments include diseases like cardiac failure, tuberculosis, anaemia, diabetics, blood pressure, AIDS and others.

Table 2.12A: Incidence of diseases among adult (Male and Female) - Annual frequency - East coast India

Sl. No:	Diseases	Districts											
		TN		PU		AP		OR		WB		Total	
		M	F	M	F	M	F	M	F	M	F	M	F
	(i) Common Diseases												
1.	Fever/Flu	2.73 (74)	2.45 (72)	1.93 (135)	2.05 (76)	0.96 (241)	1 (250)	2.10 (131)	1.8 (106)	1.21 (61)	1.38 (57)	2.73 (74)	2.73 (74)
2.	Body Aches	3.34 (72)	1.95 (20)	0.44 (50)	0.8 (84)	0.8 (84)	0.052 (13)	2.80 (50)	3.8 (27)	8.92 (13)	11.83 (18)	3.34 (72)	3.34 (72)
3.	Diahorrea	0.82 (40)	2.02 (37)	1.29 (131)	1.5 (133)	Nil	Nil	1.70 (14)	1.4 (12)	2.25 (4)	1 (4)	0.82 (40)	0.82 (40)
4.	Gastroenteric disease	Nil	Nil	0.007 (1)	Nil	Nil	Nil	2.1 (47)	1.8 (35)	5.53 (13)	4.82 (17)	Nil	Nil
5.	Skin disorder	1.37 (12)	1.08 (3)	0.007 (1)	Nil	Nil	Nil	1.3 (20)	1.7 (19)	12 (15)	0	1.37 (12)	1.37 (12)
6	Reproductive disorder	1.10 (5)	0.50 (1)	Nil	Nil	Nil	Nil	2 (2.)	2 (2)	12 (1)	12 (1)	1.10 (5)	1.10 (5)

	(ii) Special Ailments												
7.	Cardiac failure	0.66 (3)	0.56 (4)	0.007 (1)	Nil	Nil	Nil	1 (1)	1 (2)	1 (4)	1 (1)	Nil	Nil
8.	TB	1.33 (7)	0.25 (2)	Nil	Nil	Nil	Nil	1 (10)	1 (2)	7	0	Nil	Nil
9.	Anaemia	0.37 (2)	2.12 (12)	Nil	Nil	Nil	Nil	1.8 (5)	0 (0)	0	12 (1)	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	0 (0)	Nil	12	12	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	Nil	0.02 (4)	0.01 (2)	Nil	Nil	2.5 (13)	2.1 (7)	11.23	10.61	Nil	Nil

Figures in parenthesis indicate the number of incidence in families,
(others include Thyroid, Sinus)*

Table 2.12B: Incidence of diseases among adult (Male and Female) - Annual frequency - West coast India

Sl. No:	Diseases	Districts											
		KR		KN		GA		MH		GU		Total	
		M	F	M	F	M	F	M	F	M	F	M	F
	(i) Common Diseases												
1.	Fever/Flu	2.18 (115)	2.12 (111)	122	88	3.00 (94)	2.78 (88)	1.67 (180)	1.38 (112)	287	296	Nil	Nil
2.	Body Aches	3.18 (69)	3.91 (55)	3	2	3.25 (42)	3.40 (57)	6.03 (123)	1.37 (67)	183	143	Nil	Nil
3.	Diahorrea	1.50 (9)	1.36 (7)	39	2	0.05 (3)	0.05 (2)	1.21 (25)	0.60 (8)	174	148	Nil	Nil
4.	Gastroen-teric disease	1.23 (26)	1.26 (17)	5	2	0.55 (9)	0.05 (6)	1.84 (42)	0.71 (21)	32	53	Nil	Nil
5.	Skin disorder	1.33 (6)	1.28 (15)	23	15	Nil	0.05 (1)	0.90 (9)	0.64 (23	22	15	Nil	Nil
6	Reproductive disorder	Nil	Nil	7	Nil	Nil	Nil	Nil	0.47 (15)	0	Nil	Nil	Nil
	(ii) Special Ailments												
7.	Cardiac failure	Nil	0.16 (1)	6	Nil	Nil	Nil	0.20 (3)	0.40 (2)	Nil	Nil	Nil	Nil
8.	TB	2.00 (1)	Nil	15	Nil	Nil	Nil	0.20 (2)	0.20 (2)	Nil	Nil	Nil	Nil
9.	Anaemia	0.16 (6)	0.19 (7)	Nil	Nil	Nil	Nil	0.40 (4)	0.30 (14)	Nil	Nil	Nil	Nil

10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	0.40 (2)	Nil	Nil	Nil	Nil	Nil
13.	Others*	2.44 (10	3.08 (10)	3	Nil	Nil	Nil	0.62 (23)	0.25 (19)	Nil	Nil	Nil	Nil

Figures in parenthesis indicate the number of incidence in families,
(others include Thyroid, Sinus)*

In continuation with the above tables, the major diseases found in both east coast and west coast of India were fever/flu, body aches, diahorrea, gastro enteric disease, skin disorder and reproductive disorder. The most common diseases found among the respondent families of both areas were fever and body aches. In the east coast of India, on an average, the annual frequency of fever/flu found among male members of the respondent families was 1.79 times and it was 1.74 times among female members. In the case of body aches, the annual frequency was found to be 3.26 times/year in males and 3.69 times in females. Occurrence of diahorrea and skin disorder was at a frequency of 1.52 times a year among male and 1.48 times in a year among females. Whereas in the case of west coast, frequency of fever/flu among male members was at 2.28 numbers and it was 2.09 numbers among female members. In the case of body ache the annual frequency was 4 times in males and 2.9 times in females.

The most common special ailments found among the respondents in both areas were cardiac failure, TB and anaemia etc.

(v) Access to health care

The access to health care is also an important parameter which determines the continued health of the fisherfolk. Often the distance leads to the non treatment or its delay. The access to health care was measured using the distance required to avail the same. (Table 2.13). The results indicate that there exists considerable access to the primary health centre

Table 2.13: Access to health care (km)

Sl. No.	States	Primary Health Centre	Hospital
1.	Andhra Pradesh	1.10	2.05
2.	Goa	4.97	5.78
3.	Gujarat	6.06	18.37
4.	Karnataka	1.16	7.06
5.	Kerala	1.18	5.78
6.	Maharashtra	0.71	3.66
7.	Orissa	2.80	3.90
8.	Puduchery	3.15	7.45
9.	Tamil Nadu	0.84	5.08
10.	West Bengal	1.08	16.00
11.	Total (Average)	2.31	7.51

and hospital across the states. On an average the primary health centre was available at a distance of 2.31 km and the hospital at 7.51 km across the states. However, Gujarat is having comparatively less access to health care facilities as the distance to hospital and primary health centre was more than the other states with 18.37 km and 6.06 km respectively. Likewise, access to hospital facilities in West Bengal was also comparatively poor as it located 16 km apart (figure2.10).

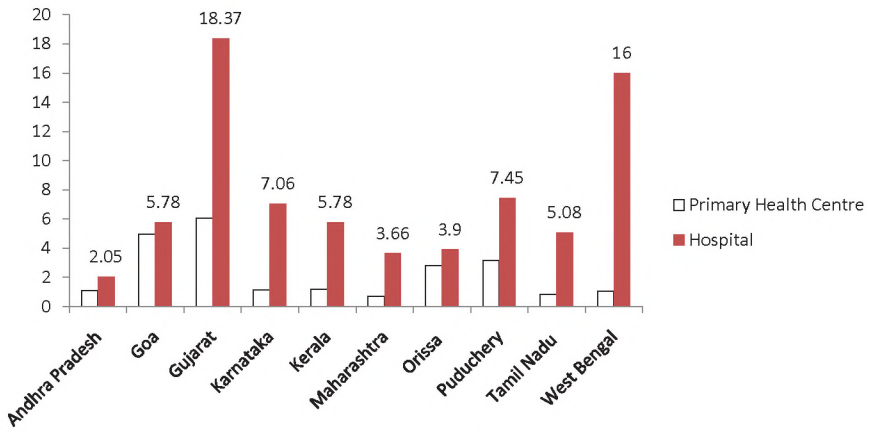


Fig: 2.10 Access to health care institutions

(vi) Problems in health management

The major problems underwent in health management was analyzed based on the opinion of the sample respondents. The major reasons cited by the respondents are indicated in Table 2.14. The major reasons suggested include difficulty in accessing the hospital due to distance, non availability of specialist and paramedics in health centres, poor infrastructure, lack of adequate effective medicines, problems on cleanliness/sanitation, drinking water problem and work related stress.

Non availability of specialist and paramedics in health centres was the major problem as perceived by the respondent households across the states (41.44 per cent) especially in West Bengal (57.75), Goa (10.80), and Karnataka (13.62). 40 per cent of the total respondents opined on lack of adequate effective medicines as a major problem followed by poor infrastructure (26 per cent). Drinking water and problems on cleanliness/sanitation was found to be an impeding factor in Karnataka and Orissa. Work related stress is not a big concern for most of the respondents

(vii) Suggestions to improve healthcare facilities

The respondent households opined on the different suggestions for improving the health care facilities and the details are furnished in Table 2.15. The major suggestions include, increasing the number of doctors/specialists, construction of quarters facility for doctors so that they are available 24 x 7, providing available sufficient medicines for all diseases with free of cost, construction of the modern hospital with all infrastructure and healthcare

Table 2.14: Problems in health management (Frequency)

Sl. No	Problems	States										
		AP	GA	GU	KN	KR	MH	OR	PU	TN	WB	TOT
1.	Difficulty in accessing the hospital due to distance	5	0	1	0	2	0	0	18	1	18	45
2.	Non availability of specialist and paramedicines in health centres	5	23	0	0	29	0	0	15	18	123	213
3.	Poor infrastructure	4	0	0	0	33	11	0	10	32	46	136
4.	Lack of adequate effective medicines	4	0	0	0	25	3	48	3	48	76	207
5.	Problems on Cleanliness/ Sanitation	4	0	0	0	45	0	23	0	8	0	80
6.	Drinking water problem	4	0	0	0	54	1	23	0	13	0	95
7.	Work related stress	5	0	0	0	2	0	10	0	0	0	17
8.	Others	5	0	100	75	0	2	0	0	0	0	182
9.	Total	36	23	101	75	0	17	104	46	112	0	514

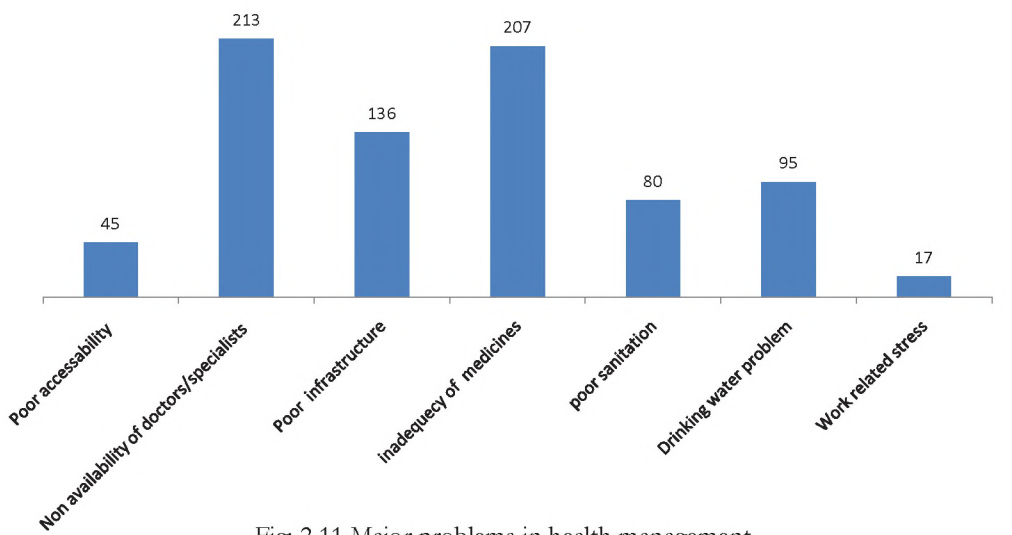


Fig: 2.11 Major problems in health management

facilities, provision of ambulance for emergency (especially during delivery, accidents, etc.) and providing good drinking water facility. More than 50 per cent of the respondents across the states demanded for modern hospital with all infrastructure and health care facilities and 41 per cent of the respondents demanded for more number of doctors/specialists.

Table 2.15: Suggestions to improve health care facilities (Frequency)

Sl.No	Suggestions	States										
		AP	GA	GU	KN	KR	MH	OR	PU	TN	WB	TOT
1.	Increase the number of doctors/ specialists	0	1	0	0	25	0	33	13	28	100	200
2.	Make quarters facility for doctors so that they are available 24 x 7	0	0	0	0	0	0	0	13	15	24	52
3.	Make available sufficient medicines for all diseases with free of cost	0	1	0	22	34	0	40	0	23	34	154
4.	Construction of modern hospital with all infrastructure and health care facilities	0	0	41	54	22	11	25	0	0	97	250
5.	Provide ambulance for emergency (especially during delivery accidents, etc.)	0	0	0	0	8	0	0	6	8	0	22
6.	Need good drinking water facility	0	0	0	0	31	3	21	0	13	0	68
7.	Total	0	2	41	76	120	14	117	32	87	0	489

D. Income status of respondent households

The income profile of the respondent households were analyzed using income patterns, respondent's involvement in non fisheries activities and expenditure pattern. In addition the indebtedness and savings were analyzed using details on savings, indebtedness, sources of lending, purpose of availing loan and suggestions for enhancing the income and employment generation.

(i) Income pattern of respondent households

The income pattern of the respondent household were analyzed using the monthly income across the coastal states of India are discussed in the Table 2.16.

The major income sources of the respondent households comprised of income from fishery, business, agriculture, labour services, and other service sectors. The highest monthly average income generated by the total respondents across different coastal states was through fisheries sector contributing Rs. 6757.08 (77.29 per cent of the total income) with a highest share from Puducherry (Rs. 17657) and Andra Pradesh (Rs. 11223). This is followed by income from labour at Rs. 956.56, income from business at Rs. 576.82 and from agriculture sector at Rs.269.83.

The state wise monthly income status of the respondents indicated that Karnataka had no other sources of income other than fisheries sector contributing an average monthly income of Rs.4308.16. In Andrapradesh the average income shared by fisheries sector, business and other service sectors was 76.45 and 15.72 and 7.83 per cent respectively.

In Tamil Nadu the major income sources of respondents were fisheries sector, business sector, labour and other service sector making a total monthly income of Rs. 8531.50.The total income of Rs.13715.00 in Gujarat was shared by fishery sector with a total amount of

Rs.5354.19 (39.04), labour with a total amount of Rs. 5961.20 (43.46) and business with a total amount of Rs.2000 and Rs.400 respectively.

Table 2.16 Income pattern of respondent households

Sl.No	States	Enterprise					
		Fishery	Labour	Agriculture	Business	Any others	Total
1.	Andhra Pradesh	11223.10 (76.45)	0.00 (0.00)	0.00 (0.00)	2307.80 (15.72)	1150.00 (7.83)	14679.00 (100.00)
2.	Goa	5826.12 (75.94)	797.36 (10.39)	13.08 (0.17)	964.72 (12.57)	70.72 (0.92)	7671.90 (100)
3.	Gujarat	5354.19 (39.04)	5961.20 (43.46)	2000.00 (14.58)	400.00 (2.92)	0.00 (0.00)	13715.00 (100)
4.	Karnataka	4308.16 (100)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	4308.16 (100)
5.	Kerala	5719.66 (74.44)	1056.10 (13.74)	0.66 (0.01)	627.90 (8.17)	279.66 (3.64)	7690.20 (100)
6.	Maharashtra	4196.19 (88.87)	321.67 (6.81)	18.52 (0.39)	185.49 (3.93)	0.00 (0.00)	4721.87 (100)
7.	Orissa	2659.20 (97.02)	11.20 (0.41)	0.00 (0.00)	70.40 (2.57)	0.00 (0.00)	2740.80 (100)
8.	Puduchery	17657.10 (97.16)	200.00 (1.10)	0.00 (0.00)	128.48 (0.71)	188.56 (1.04)	18174.20 (100)
9.	Tamil Nadu	7954.19 (93.23)	92.85 (1.09)	0.00 (0.00)	355.88 (4.17)	128.57 (1.51)	8531.50 (100)
10.	West Bengal	2672.92 (51.48)	1125.24 (21.67)	666.00 (12.83)	727.60 (14.01)	0.00 (0.00)	5191.20 (100)
11.	Average	6757.08 (100)	956.56 (100)	269.83 (100)	576.82 (100)	181.75 (100)	8742.41 (100)

Figures in parenthesis indicate percentage to total

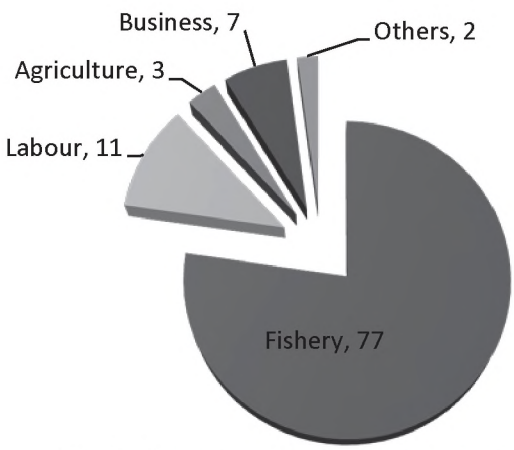


Fig: 2.12 Income status of the respondents

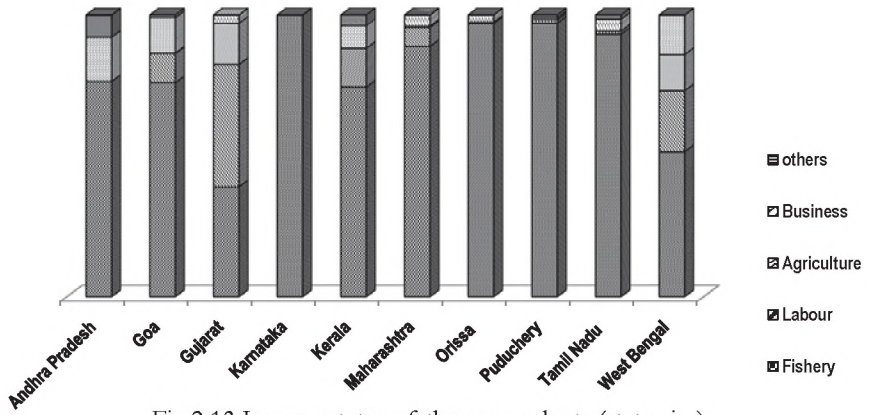


Fig 2.13 Income status of the respondents (statewise)

(ii) Involvement in non-fisheries activities

The involvement of respondent households' in non-fisheries activities are illustrated in the Table 2.17.

The analysis on the respondent households' involvement in the non-fisheries activities indicated that many of the respondents were involved in non-fisheries activities, which provided them an additional source of income. The major non-fishing activities involved by respondents were business, labour, agriculture and other service sectors with a contribution of 25.79, 45.41, 12.21 and 17.97 per cent respectively. The total number of respondents involved in business was 22.34 per cent in Andhra Pradesh. In West Bengal 38.37 per cent of the respondents involved in labour activities which might be due to the higher wage rate prevailing in the state. It was found that there was not even a single respondent involved in labour and agriculture activities in Karnataka. Likewise in Orissa, Puduchery, and Tamil Nadu there was not a single respondent involved in agriculture activities to gain additional income.

The result clearly indicated the existence and practice of alternative avocation in the selected respondent households.

Table2.17: Respondents involvement in non-fisheries activities

Sl. No	States	Respondents involved in non-fisheries activities				
		Labour	Agriculture	Business	Any others	Total
1.	Andhra Pradesh	98(29.61)	55(61.80)	42(22.34)	85(64.89)	280(38.41)
2.	Goa	13 (3.93)	1(1.12)	14(7.45)	4(3.05)	32(4.39)
3.	Gujarat	1 (0.30)	1(1.12)	30(15.96)	0	32(4.39)
4.	Karnataka	0	0	1(0.53)	0	1(0.14)
5.	Kerala	33 (9.97)	2(2.25)	24(12.77)	28(21.37)	87(11.93)
6.	Maharashtra	49 (14.80)	6(6.74)	40(21.28)	0	95(13.03)
7.	Orissa	3 (0.91)	0	11(5.85)	0	14(1.92)
8.	Puduchery	4 (1.21)	0	3(1.60)	9(6.87)	16(2.19)
9.	Tamil Nadu	3(0.91)	0	8(4.26)	5(3.82)	16(2.19)
10.	West Bengal	127(38.37)	24(26.97)	15(7.98)	0	156(21.40)
11.	Total	331(100)	89(100)	188(100)	131(100)	729(100)

Figures in parenthesis indicate percentage to total

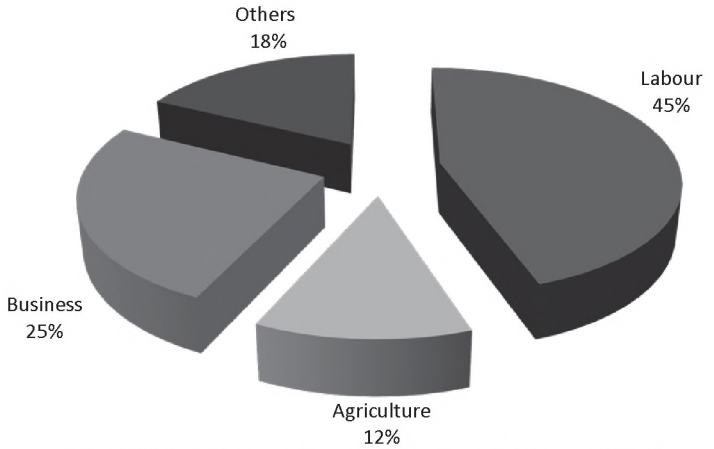


Fig: 2.14 Involvement in non-fisheries activities – All India

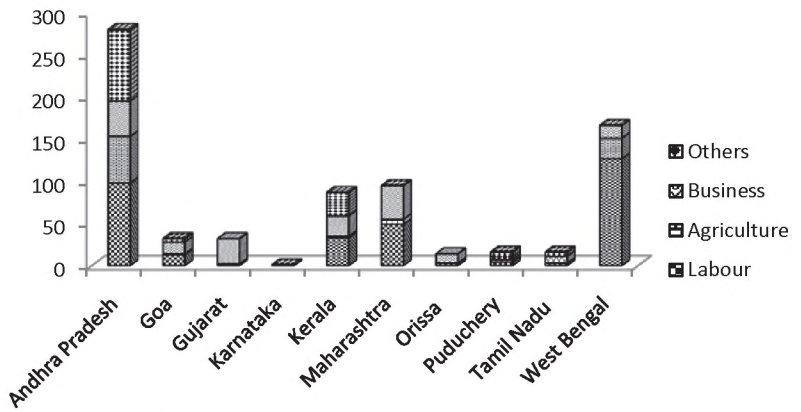


Fig: 2.15 Involvement in non-fisheries activities – State wise

(iii) Pattern of expenditure

The major household expenses measured include expenditure on food, clothing, fuel, medical, education, entertainment, personal and durables. The result of the pattern of monthly expenditure is represented in Table 2.18.

The average monthly expenditure pattern of the households worked out across the states, was at Rs 6961.57 with an average share of Rs 2741.981 (41 per cent) on food, Rs 893.044 (14 per cent) on personal and 665.224 (10 per cent) on medical expenses. The least expenditure was at Rs 374.78 (6 per cent) to purchase fuels.

The total expenditure pattern of the selected states indicates that the highest household expenditure was noticed in Puduchery with an average amount of Rs. 13488 and the least in Orissa with an average amount of Rs 2595.2. In Karnataka fisherfolks spent more on education, with an average amount of Rs 1369.46, than that of other selected states. The least amount spent on education was by respondent households of Orissa with an average amount of Rs 87.2.

In Puduchery the least expenditure was incurred on entertainment with an average amount of Rs 26.4. The medical expense was high in Karnataka at Rs 2557.42 when compared with other selected coastal states.

The results clearly spelt out that the expenditure incurred on food contribute most of the family expenditure. Education, entertainment and social security measures share higher proportion in the family expenditure across the selected coastal states (Fig. 2.16, 2.17).

Among the different components of expenditure Rs 2741.98(41 per cent) was spent on food followed by personal 893.04 (14 per cent).

Table 2.18: Monthly expenditure pattern of the fisher family (Rs.)

Sl.No	States	Items								
		Food	Cloth-ing	Fuel	Medi-cal	Educa-tion	Enter-tain-ment	Per-sonal	Dura-bles	Total
1.	Andhra Pradesh	3004.8	852.88	601.73	601.92	400.00	1603.84	1842.30	67.30	8917.11
2.	Goa	1827.44	244.48	477.00	484.24	350.72	343.96	1700.64	288.00	5716.48
3.	Gujarat	1597.82	177.71	187.10	399.48	214.09	166.64	734.84	1366.66	4844.32
4.	Karnataka	2023.98	751.42	210.38	2557.42	1369.46	236.30	215.50	0.00	7364.66
5.	Kerala	2888.89	302.80	329.79	350.96	366.00	260.64	689.33	2274.04	7961.72
6.	Maharashtra	3683.36	1593.84	291.84	463.76	581.56	256.32	434.88	573.48	7879.04
7.	Orissa	1516.40	135.20	100.00	126.40	87.20	147.20	470.40	4.80	2595.20
8.	Puduchery	8434.72	931.52	857.92	631.52	895.36	26.40	1142.12	568.96	13488.00
9.	Tamil Nadu	2781.82	309.27	260.96	726.76	454.81	1163.95	1305.59	82.87	7086.03
10.	West Bengal	2160.58	175.72	431.08	309.78	156.64	41.76	394.84	93.20	3763.60
11.	Average	2741.99	547.48	374.78	665.22	487.58	424.70	893.04	531.93	6961.57

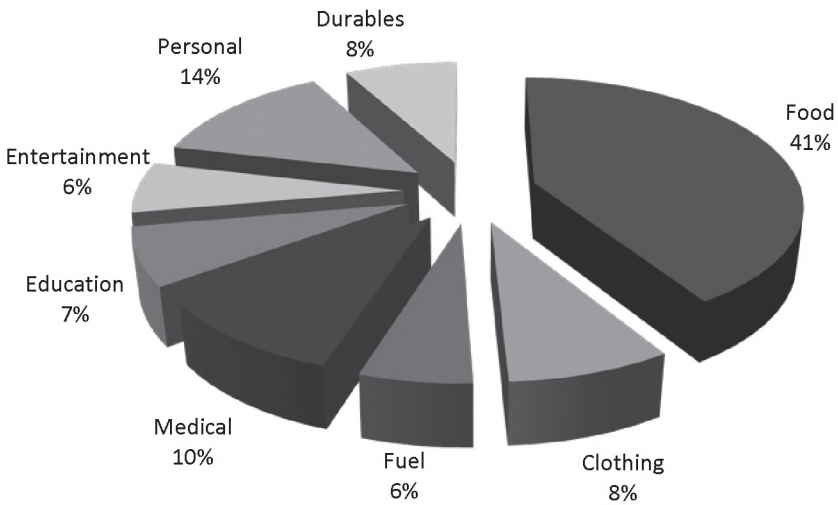


Fig: 2.16 Average monthly expenditure pattern

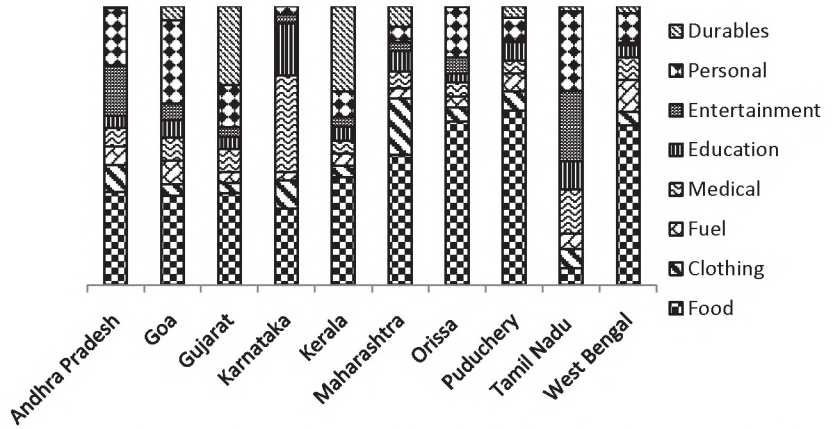


Fig: 2.17 Pattern of expenditure of the fisher family (Monthly Rs) state wise

(iv) Indebtedness and Savings

The saving details of the respondent's household indicated that about 65.5 per cent of the respondents have no savings. 30.24 per cent of the respondent households possessed a saving of less than Rs.50000. It is significant to note that 96.43 per cent of the households which had savings were from Puduchery. Lack of savings or dis savings related to the need for indebtedness for the sustenance of the livelihoods. The average savings of a household in Puducherry was found to be 96.43 per cent whereas that of a household in Orissa was 43.66 per cent. The plight of respondent households from Kanyakumari and Tuticorin is well understood where none of them possess savings.

Table 2.19: Savings details of respondent households (Number)

Sl.No	States	Frequency of respondents having Savings				Total
		Nil	< 50 k	50-100.00k	>100.00k	
1.	Andhra Pradesh	125	100	25	0	250
2.	Goa	82	69	2	0	153
3.	Gujarat	73	52	15	0	140
4.	Karnataka	124	16	0	0	140
5.	Kerala	116	24	0	0	140
6.	Maharashtra	150	108	5		263
7.	Orissa	62	80			142
8.	Puduchery	135	1	3	1	140
9.	Tamil Nadu	122	17	0	1	140
10.	West Bengal	92	32	14	0	142
11.	Total	1081	499	59	2	1650

(v) Indebtedness of the respondents households

The lack of savings and increased expenditure for mere sustenance often lead to indebtedness.

The results indicated that the average amount of indebtedness per person was Rs. 32027.66 in which the highest average amount of indebtedness was recorded in Kerala with

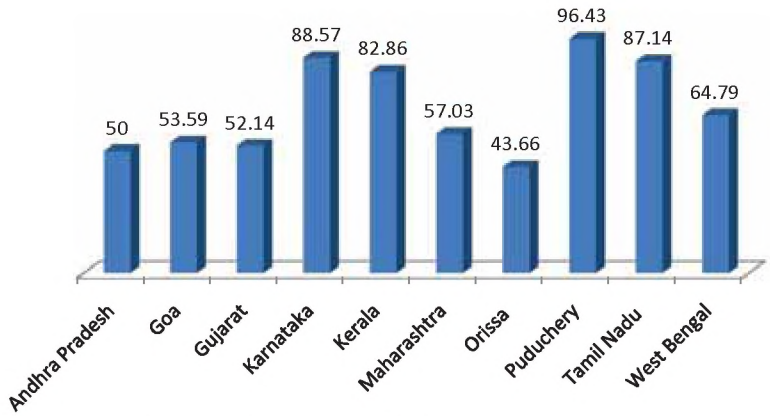


Fig: 2.18 Percentage of fishers having savings

Rs. 82292.80. The highest proportion of respondents who borrowed money for different purposes was found in Andhra Pradesh with 31.85 per cent followed by Kerala with 10.83 per cent. It was found that the average amount repaid by the respondents in Goa was high with 53.61 per cent.

Table 2.20. Indebtedness of respondent's households (Rs.)

Sl.No	States	Indebtedness			
		Number of persons	Average Amount per person	Average Amount repaid	Per cent repaid
1.	Andhra Pradesh	250 (31.85)	17500.00	2000.00	11.43
2.	Goa	74 (9.43)	13606.51	7294.90	53.61
3.	Gujarat	62 (7.90)	63944.15	16625.25	26.00
4.	Karnataka	0.00	0.00	0.00	0.00
5.	Kerala	85 (10.83)	82292.80	15225.49	18.50
6.	Maharashtra	71 (9.04)	8919.74	504.90	5.66
7.	Orissa	80 (10.19)	24792.75	6198.25	25.00
8.	Puduchery	54 (6.88)	44178.60	11044.60	25.00
9.	Tamil Nadu	76 (9.68)	27394.30	2463.00	8.99
10.	West Bengal	33 (4.20)	5620.05	1120.00	19.93
11.	Total	785 (100.00)	32027.66	6941.82	21.67

Figures in parenthesis indicate percentage to total

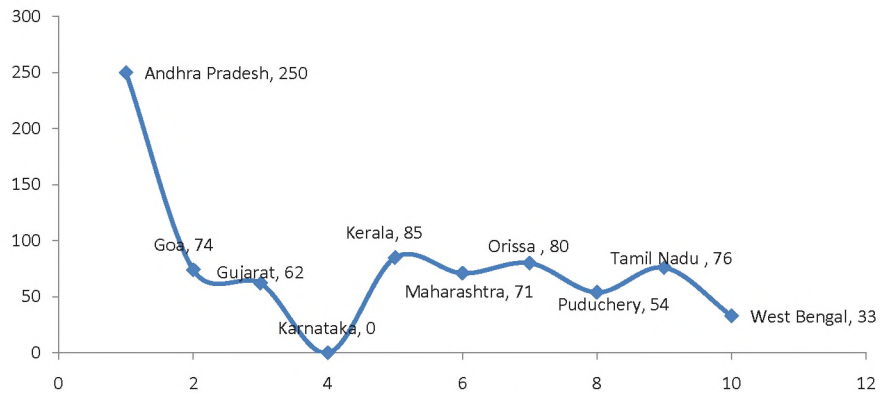


Fig 2.19 Level of indebtedness

On an average 19.41 per cent of the availed loans was repaid .The analysis of repayment of the debt indicated that the respondent's households in Goa repaid 53.61 per cent of the loans availed whereas the least repayment was found in Maharashtra with 5.66 per cent.

(vi) Sources of lending

The indebtedness often results in availing loans from the different institutions. The major lending organizations include banks, co-operatives, private money lenders, friends/relatives and jewel loans. The details of the sources of money lending as availed by the respondent households is furnished in Table 2.21.

A total of 839 respondents had availed loans for various purposes. It was found that private money lenders constituted the major source of lending with more than 29.32 per

Table 2.21: Sources of lending

Sl.No	Sources	States										
		AP	GA	GU	KN	KR	MH	OR	PU	TN	WB	TOTAL
1.	Banks	13	47	0	0	26	41	5	1	35	11	179 (21.33)
2.	Co-operative	12	12	0	0	39	1	1	0	7	4	76 (9.06)
3.	Private money lenders	50	0	58	0	25	2	8	46	41	16	246 (29.32)
4.	Friends / Relatives	25	0	4	0	0	7	0	0	0	1	37 (4.41)
5.	Jewel loans	150	0	0	0	3	0	0	13	3	0	169 (20.14)
6.	Others (SHGs)	0	8	0	0	0	2	37	0	85	0	132 (15.73)
7.	Total	250	67	62	0	93	53	51	60	171	32	839 (100.00)

Figures in parenthesis indicate percentage to total

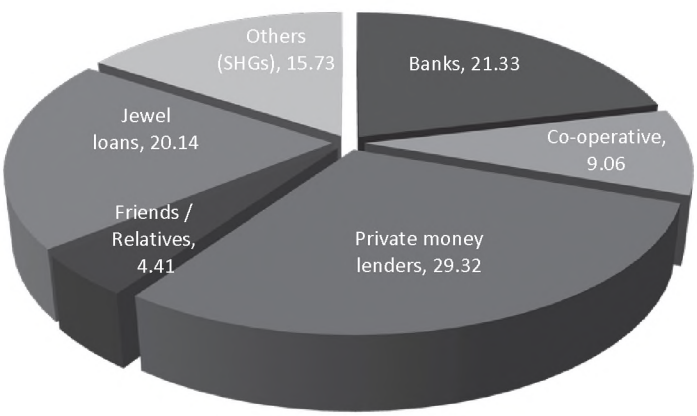


Fig 2.20: Sources of lending

cent beneficiaries of the respondent household availing credit. Banks provided credit to 179 respondents and constituted more than 21.33 per cent of the sample respondents.

Among the 839 loans availed 29.32 per cent was provided by the private money lenders followed by banks (21.33 per cent). The analysis indicate that the non institutional credit still holds good among the fishers in India. It was found that the highest number of respondents (29.32 per cent) was depending on money lenders for borrowing money in emergency situation.

(vii) Purpose of availing loans

The details on the purpose of availing loans and number of loans availed by the respondent households are indicated in Table 2.22.

The major purposes for which loans were availed included purchase of craft gear and other fishing related equipments, house construction/land purchase, marriage expenses., education and health and social security.

House construction and land purchase were the major reason for availing loans. It was found that of the 714 respondents who availed loans, more than 17 per cent was availed for the purpose of house construction and land purchase. Purchase of gears and other fishing related equipment found importance among 39.22 per cent of the respondent households.

Table 2.22. Purpose of availing loans (Number of respondents who had availed)

Sl.No	Purpose	States										
		AP	GA	GU	KN	KR	MH	OR	PU	TN	WB	TOT
1.	Purchase of craft/ gear and other fishing related equipments	40	42	55	0	17	39	7	32	23	25	280 (39.22)
2.	House construction / Land purchase	10	15	1	0	52	7	3	9	29	2	128 (17.93)
3.	Marriage expense	20	0	0	0	14	1	0	2	11	2	50 (7.00)
4.	Education	20	10	0	0	3	4	0	5	11	0	53 (7.42)
5.	Health and social security	0	15	4	0	4	3	1	5	11	0	43 (6.02)
6.	Any others (business and purchase of vehicles)	10	17	2	0	2	38	1	2	85	3	160 (22.41)
7.	Total	100	99	62	0	92	92	12	55	170	32	714 (100)

Figures in parenthesis indicate percentage to total

In Andhra Pradesh, expenses for the purchase of craft and gear was found to be the major stake (40 per cent) among the sample respondents followed by marriage and education expense (20 per cent). In Goa the amount of loan availed was highest for the purchase of craft and gear (42 per cent) followed by other expenses (business and purchase of vehicles) (17 per cent). In Gujarat the major chunk of loans were attributed towards purchase of craft/ gear and other fishing related equipment followed by house construction and land purchase (55 per cent). In Kerala 52 per cent of the respondents availed loans for house construction and land purchase followed by purchase of crafts/gear and other fishing related equipment. (17 per cent)

(viii) Suggestions to enhance the income and employment generation

The percentage response of the respondents' suggestions for enhancing the income and employment generation by fishermen is indicated in Table 2.23

Table 2.21: Suggestions to enhance the income and employment generation

Sl. No:	Suggestions	AP	GU	KR	OR	PU	TN	WB	TOT
1.	Arranging the institutional financial support like micro credit for fisheries, SHG, etc	48	Nil	39	8	47	39	103	284 (46.79)
2.	Regulation of fish marketing through institutional interventions	38	Nil	Nil	Nil	0	17	73	128 (21.09
3.	Vocational training for fisher women to undertake house hold income activities during dry/ off season	22	Nil	Nil	Nil	7	8	Nil	37 (6.1)
4.	Regulation of PDS and supply of the basic food items and fuel (like kerosene, LPG, etc) by the govt. agencies	10	Nil	Nil	Nil	6	5	Nil	21 (3.46)
5.	Provisional of rural infrastructure for general societal / human development	15	18	Nil	5	0	3	96	137 (22.57)
6.	Total	133	18	39	13	60	72	272	607 (100)

Figures in parenthesis indicate percentage to total

The major suggestions perceived by the households included arranging the institutional financial support like micro credit for fisherfolk through SHG, regulation of fish marketing through institutional interventions; vocational training for fisherwomen to undertake house hold income activities during dry/off season; regulation of PDS and supply of the basic food items and fuel(like kerosene, LPG, etc) by the Govt. agencies and provision of rural infrastructure for general societal/human development.

The percentage response of the respondents indicated that 46.79 per cent of the respondents felt that arranging the institutional financial support like micro credit for fisheries through SHG, can provide a major impetus in enhancing the income and employment generation followed by the regulation of fish marketing through institutional interventions (21.09 per cent). Vocational training for fisherwomen to undertake household income activities during dry/ off season was suggested by 6.10 per cent of the respondents. The suggestions on regulation of PDS and supply of the basic food items and fuel (like kerosene, LPG, etc) by the Govt. agencies and provision of rural infrastructure for general societal / human development was expressed by 3.56 and 22.57 per cent of the respondents respectively.

Mariculture 03

03

Mariculture

Shyam S. Salim and R. Narayanakumar

Introduction

Kerala and Tamil Nadu contribute significantly to the mariculture in India. In Kerala mussel farming is carried out intensively in northern districts. In Tamil Nadu seaweed, Kappaphycus alvarezii, farming is gaining momentum in the recent years especially in Ramanathapuram district. The commercial cultivation of K. alvarezii was started in 2003 along the Tamil Nadu coast. At present, K. alvarezii production is carried out in five coastal districts of Tamil Nadu namely Ramanathapuram, Pudukottai, Thoothukudi, Thanjavur and Kanyakumari. Nearly 1000 to 1200 families in Tamil Nadu depend on Kappaphycus farming for their livelihood. All of the seaweed farming in Ramanathapuram district is under the kudumbam (family) model of cultivation. The cultivation is organized by members of an SHG who normally belongs to the same family but may also include other members from the same community. In Tamil Nadu from the year 2003 to 2009, K. alvarezii production has shown a steady increase from 147 tonnes to the maximum of 865 tonnes in the year 2009 on dry weight basis (Krishnan and Kumar, 2010). Both Kerala and Tamil Nadu states were selected to assess the literacy, health and income status of marine fisher folk involved in mariculture.

Scope of the study

The study will provide a framework for drawing suitable programmes for the upliftment of fisherfolk in mariculture sector with particular focus on their literacy, health and income profiling. In short, the study will be highly useful to researchers, planners and policy makers in overcoming the problems of the socio economic parameters which determines the sustained development of the fisherfolk.

Objective

The overall objectives of the study are to document the socio-economic status of fishers across the different coastal states in India. However the specific objectives are to assess the status of literacy, health and income of mariculture fishers in India.

Methodology

The study was based on the data collected from primary and secondary sources. The primary data were collected from selected respondents using comprehensive and pre-tested questionnaires. The primary data provided concise, clear, complete, and unbiased information about the respondent. The important variables considered for the study were gender, age, literacy, health and income parameters

Both Kerala and Tamil Nadu states were selected to assess the literacy, health and income status of marine fisher folk involved in mariculture. In Kerala, Ernakulam, Kasargode and Kollam districts were selected. In Tamil Nadu, Ramanathapuram district was selected. These districts were selected, since mariculture activity was predominant. The study covered 225 respondent households, which included 125 households representing Kerala state and 100 households representing Tamil Nadu state. The sampling was done based on random sampling method from the selected villages.

Data Collection

The data collection was done using a pre structured survey schedule (Annexure-I) after a reconnaissance survey from the selected sample respondents. The data collection was based on four parameters viz., the general particulars, literacy, health, and income profiling. The data collection was done by the project team in most cases and in some locations, trained enumerators were employed. The data collected were tabulated and the results were analyzed.

Tools of Analysis

The conventional tools of analysis and percentage analysis were used to process the data of the literacy, income and health status of the fishers in India and to arrive at meaningful conclusions .The data obtained from the respondents were systematically tabulated for the purpose of analysis.

Limitations of the study

The present study relied on primary data collected through the questionnaire survey methodology. The inherent faults and limitations in the primary data collection such as respondents' recall bias due to the absence of proper records on their income, health details, expenditure, savings and indebtedness etc with the respondents are to be recognized. The information was collected from the respondents based on their memory and experience and the bias cannot be eliminated fully. But in the context of the study, care was taken to avoid personal bias while giving information. Apparent limitations like getting only seasonal information; having data that is for a specified period of time, depending on data that is word of mouth (with its inherent contradictions) as primary data should be considered. The income and expenditure pattern and health parameters of the respondents subject to change in the short run as well as long run, also need to be considered. This study was confined to the randomly selected villages in coastal states of India.

Results and Discussions

The results and discussions are presented under the following heads

A. General Particulars
B. Literacy Status
C. Health Status
D. Income Status

A. General particulars

The general particulars of respondent's households included age, family size, family composition etc.

(i) Age distribution

The age distribution of the respondent households is furnished in Table 3.1. The age of the respondents are categorized into three sub groups viz, young (15-35 year), middle age (36-55 year), old (>56 year) etc.Mariculture continues to be an activity mostly done by fisher folk in the age group of 36-55 which constitutes about 63.11 per cent of the respondents. The distribution also indicated the representation of young (age less than 35) constituting to 25.33 per cent. The fisher folk with age more than 56 was found to be 11.56 per cent and represents the least. It was important to note that fishing appears as a viable option for livelihood among the age group of less than 35 years in Tamil Nadu.

(ii) Family composition

Table 3.1: Age distribution of the sample respondents (Years)

Sl.No.	State	<35	36-55	>56	Total
1.	Kerala	17 (13.60)	94 (75.20)	14 (11.20)	125 (100)
2.	Tamil Nadu	40 (40.00)	48 (48.00)	12 (12.00)	100 (100.00)
3.	Total	57 (25.33)	142 (63.11)	26 (11.56)	225 (100.00)

Figures in parentheses indicate percentage to total

The family composition of the respondents is indicated in Table 3. 2. It is seen from the Table 3.2 that the males outnumber the females in both the states. The male – female ratio for the entire sample was 1.12 which indicated that for every 1000 females there were 1120 males which is in parity with the national scenario (1.60, based on 2001 census). The male -female ratio for Kerala and Tamil Nadu state was 1.14 and 1.10 respectively. The male female ratios are depicted in Figure 3.1.

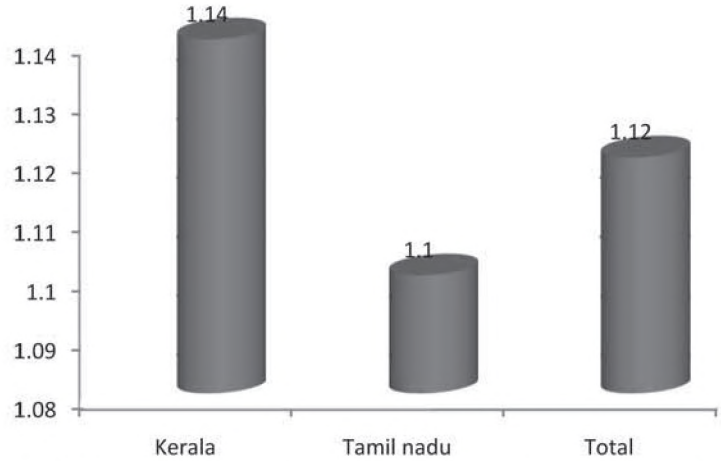


Fig 3.1: Male female ratio of mariculture fishers of Kerala and Tamil Nadu

Table 3.2: Family composition of the respondent households –Male and Female (Number)

Sl.No	State	Households	Male	Female	Total
1.	Kerala	125	249 (58.20)	219 (46.79)	468 (100.00)
2.	Tamil Nadu	100	192 (52.50)	174 (47.54)	366 (100.00)
3.	Total	225	441 (52.888)	393 (47.12)	834 (100.00)

Figures in parentheses indicate percentage to total

(iii) Family size

The small family norm is mostly adopted by the fisher households of India. The average size of family in both the state worked out to be 3.70 ranging from 3.66 in Tamil Nadu to 3.74 in Kerala. However, Krishnan and Kumar, 2010 found that the average size of family among the sea weed farmers in Tamil Nadu is 4.5. The family type and family size of the respondents exhibited quite similar pattern of distribution in which a greater part (81.76 per cent) were from small families having a size between 2-4, i.e. most of them were from nuclear family. It was found that 17.78 per cent of the respondents belonged to the category of family size between 5-6. It is interesting to note that big families with more than 7-10 family members are not depicted in the study (Table 3.3).

Table 3.3: Family size of the respondent households (number)

Sl.No	State	Family Size			Total	Average family size
		1	2-4	5-6		
1.	Kerala	1 (0.80)	104 (83.20)	20 (16.00)	125 (100.00)	3.74
2.	Tamil Nadu	-	80 (80.00)	20 (20.00)	100 (100.00)	3.66
3.	Total	1 (0.44)	184 (81.76)	40 (17.78)	225 (100.00)	3.70

Figures in parentheses indicate percentage to total

(iv) Age composition

The age composition of the respondent households is represented in Table 3.4. The age composition is represented by adults (more than 15 years) and children (less than 15 years). The male- female ratio of the adult group (>15 years) was found to be 1.09 whereas the same for the children (<15 years) was found to be 1.23. Adult females in the age group of above 15 years outnumbered the families in both the states and similarly, among the children (<15years) males outnumber the females in both the states, justifying the common notion preference of males towards females. It is also significant to note that the younger generation of children is almost represented by males over female. The adult- child ratio was found to be 3.51 for the total sample. The Adult – Child ratio was highest for Kerala (4.78) followed by Tamil Nadu (2.52).

Table 3.4: Age composition of the respondent households (Number)

Sl. No	State	Adult (> 15 years)		Children (< 15 years)		Total	
		Male	Female	Male	Female	Male	Female
1.	Kerala	202 (81.12)	185 (84.93)	47 (18.87)	34 (15.60)	249 (100)	219 (100)
2.	Tamil Nadu	137 (71.35)	125 (71.84)	55 (28.65)	49 (28.16)	192 (100)	174 (100)
3.	Total	339 (67.87)	310 (78.88)	102 (23.13)	83 (21.12)	441 (100)	393 (100)

Figures in parentheses indicate percentage to total

B. Literacy status

The literacy status of the respondent households was analyzed through the literacy level, educational status – continuing and dropouts and access to educational facilities. The illiterate indicates fisher folk without any formal education and doesn't even possess functional literacy.

(i) Literacy Status

The literacy status includes the level of education as indicated by primary, secondary and collegiate. The primary level indicated schooling till fourth grade, secondary level indicated by high school, secondary and vocational education. The collegiate level of education was denoted by collegiate and professional education.

The general literacy rate of India as a whole was 74.52 per cent (Census-2011) against the literacy rate of 95.44 per cent among the fisher folk. The results indicate that among the literates 35.10 per cent have primary level of education, 58.79 per cent have secondary level of education and hardly 6.01 per cent have collegiate level of education. The people with high school education was more in Kerala (78.24 per cent), whereas primary level was more in Tamil Nadu (61.29 per cent). This result derives support from the findings of Krishnan and Kumar, 2010.

The literacy rate for the states of Kerala and Tamil Nadu were at 97.22 and 93.17. High percentage of literacy indicated that fisherfolk involving in farming gave more importance to education. Very meager percentage (3.00 per cent) were found to be illiterate in Tamil Nadu.

Table 3.5: Literacy Status of respondent households (Number)

Sl.No.	States	Total	Illiterate	Literate	Primary	Secondary	Collegiate
1.	Kerala	468	-	455 (100)	71 (15.60)	356 (78.24)	28 (6.15)
2.	Tamil Nadu	366	11	341 (100)	209 (61.29)	112 (32.84)	20 (5.87)
3.	Total	834	11	796 (100)	280 (35.10)	468 (58.79)	48 (6.01)

Figures in parentheses indicate percentage to total

(ii) Educational profile

The information on education of the respondents in terms of continuance and discontinuance of education would provide the scope of employment opportunities, possible migration, and alternative avocation of the sample households. Thus continuing and dropout ratios were calculated among the respondent households across the coastal states in the country. The continuing drop out ratio indicates that the level of growing importance of education between the past and the present.

The dropouts were more at secondary level of education with 67.69 per cent ranging from 37.86 per cent at Tamil Nadu to 88.10 per cent at Kerala. (Table 3.6) The dropout at primary level of education was about 29.76 per cent ranging from 8.40 per cent at Kerala to 60.08 per cent at Tamil Nadu. The dropout at collegiate level was found to be 2.55 per cent and it varies from 2.06 at Tamil Nadu to 2.90 per cent at Kerala.

It was found that the tendency to drop out education was more with secondary education followed by primary and least with collegiate education. The drop outs possessing primary education was lesser as it is mandatory for the kids to study primary level of education. Collegiate education provided a source of alternate employment and another means of livelihood.

Table 3.6: Educational status of respondent households - Continuing and Dropout (Number)

Sl.No.	States	Continuing	Drop outs			
			Primary	Secondary	Collegiate	Total
1.	Kerala	110	29 (8.40)	306 (88.10)	10 (2.90)	345 (100)
2.	Tamil Nadu	98	146 (60.08)	92 (37.86)	5 (2.06)	243 (100)
3..	Total	208	175 (29.76)	398 (67.69)	15 (2.55)	588 (100)

Figures in parentheses indicate percentage to total

(iii) Access to educational institutions

Access to education is an important yardstick to measure the socio-economic well being of a society. The proximity of the educational institutions like primary school, high school, college, and professional college provides a major impetus when it comes to continuing education. That was something the fisherfolk were said to be denied earlier which was disproved by the findings of the study.

The access to education was analyzed by finding the distance to nearby educational institutions. The average distance from fishing villages to nearby primary, high school, college and professional institution are given in Table 3.7. As a whole the average distance to a primary school is 0.92 km, high school is 2.16 km, college is 24.24 km and professional institution is 29.04 km from fishing villages combining both states. The average distance to primary school ranges from 1.00 km in Kerala to 0.84 km for Tamil Nadu. The distance to high schools ranges from 1.92 km for Kerala to 2.39 km for Tamil Nadu. With regards to colleges average distance ranges from 5.10 km for Kerala to 43.38 km for Tamil Nadu. The average distance to professional institution ranges from 7.38 km in Kerala to 50.70 km in Tamil Nadu. The results very clearly indicate the reasons for growing literacy among the fisherfolk. Thus the analysis clearly indicates that the improved or increased access to educational facilities has helped to increase the literacy level of the fisherfolk. However in Ramanathapuram district of Tamil Nadu the access to professional college is comparatively difficult.

Table 3.7: Access to Education (km)

Sl. No.	States	Primary School	High School	College	Professional College
1.	Kerala	1.00	1.92	5.10	7.38
2.	Tamil Nadu	0.84	2.39	43.38	50.70
3.	Average	0.92	2.16	24.24	29.04

C. Health Status

(i) Vaccination regime of infants / children (less than 15 years)

The average age of administration of vaccination and incidence of discontinuation among infants/ children with age less than 15 years in the selected coastal states of India is furnished in Table 3.8. The vaccination for Pox, BCG, MMR and Polio were regularly taken by all the families covered under the study. The average age at which the vaccination for pox was given to the child worked out at 1.13 years ranging from 1.00 year at Kerala to 1.25 years at Tamil Nadu. The average age at which BCG administered was 0.75 years ranging from 0.34 years at Kerala to 1.16 years at Tamil Nadu. The average age for administering MMR was 1.03 years which varies from 0.83 years at Kerala to 1.22 years at Tamil Nadu. Polio vaccine was administered till the average age of 4.44 years varying from 4.37 at Kerala to 4.5 at Tamil Nadu.

The results on the vaccination regime of infants/children indicated that the children were vaccinated in both the coastal states as per the recommendation of ICMR .

Table 3.8: Vaccination regime of infants / children (less than 15 years) – Average Age of administration and incidence of discontinuation

Sl.No:	States	Average age of administration andincidence of discontinuation (percentage)									
		Pox		BCG		MMR		Polio		Others	
		Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)
1.	Kerala	1.00	0	0.34	0	0.83	0	4.37	0	-	0
2.	Tamil Nadu	1.25	0	1.16	0	1.22	0	4.50	0	-	0
3.	Average	1.13	0	0.75	0	1.03	0	4.44	0	-	0

Normally polio administration continues till the age of 5 years

(ii) Birth weight of infants

The birth weight of infants in fisher households in the selected states is given in Table 3.9. The average birth weight of males was 2.69 kg and females was 2.72 kg. The average weight of male infants ranges from 2.69 kg at Kerala to 2.70 kg at Tamil Nadu and female infants ranges from 2.58 kg at Kerala to 2.85 kg at Tamil Nadu. This is in conformity with the average birth weight of a male and female child in India (Census-2001). The graphical representation of the birth weight of the male and female infants in both the states is presented in Figure 3.2.

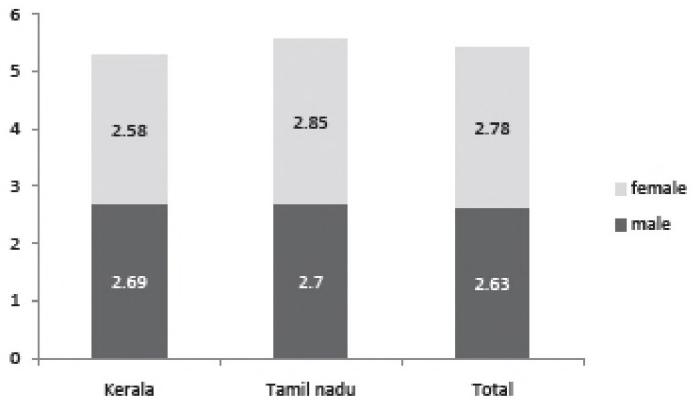


Fig. 3.2: The birth weight of male and female infants

It was found that in Kerala the average weight of the female child was less than that of the male child, whereas in Tamil Nadu the average weight of female was more than that of the male child.

Table 3.9: Birth weight of infants (kg)

Sl.No.	States	Weight (kg)		
		Male	Female	Total
1.	Kerala	2.69	2.58	2.63
2.	Tamil Nadu	2.70	2.85	2.78
3.	Average	2.69	2.72	2.71

(iii) Incidence of mortality among mother/ child during birth

The results on the incidence of mortality among mother/ child during birth are furnished in Table 3.12. Maternal and child mortality at the time of birth and infant mortality has been pressing concerns over the past. Generally in India, adequate care is being taken now to reduce the incidence of maternal and infant mortality. There was no incidence of maternal mortality, however one incidence of infant mortality was reported in Tamil Nadu state.

Table 3.10: Incidence of mortality among mother/child during birth

Sl.No.	States	No of delivery	Mortality of mother/ child during birth				
			Mother	Reason	Child	Reason	Total
1.	Kerala	3	Nil	Nil	Nil	Nil	Nil
2.	Tamil Nadu	5	Nil	Nil	1	Nil	Nil
3.	Total	8	Nil	Nil	1	Nil	Nil

(iv) Incidence of diseases among adults

The incidence, frequency, and previous occurrence of diseases among the adult family members of the respondents across the coastal states are discussed in the Table 3.11.

Major diseases found among the respondents were categorized under two groups, viz; common diseases and special ailments. Fever/flu, body ache, diahorrea, gastro enteric disease, skin disorder and reproductive disorder is included in common diseases. Special ailments include diseases like cardiac failure, tuberculosis, anaemia, diabetics, blood pressure, AIDS. The most frequent disease found was fever with the occurrence of 1.47 times in a year for males and 1.39 times for females.

Among the family members 160 males and 147 females were affected with fever. In Ramanathapuram district of Tamil Nadu, 166 family members of the respondents were severely affected by malaria fever. However body ache was found to be more among males with an average frequency of 1.38 times per year and 93 male family members of the respondents were affected by body ache last year. In the case of female members, 59 members were affected by body ache last year with an average frequency of 1.36 times a year.

Reported cases of Diahorrea and skin disorder found among the families of respondents were less across both states when compared to other common diseases.

Reported cases of special ailments found among the families of respondents were less across both the states. It is quite interesting to note that only few respondent households were affected with life style diseases.

Table 3.11: Incidence of diseases among Adult (Male and Female) - Annual frequency

Sl.No.	Diseases	Districts					
		Kerala		Tamil Nadu		Total	
		M	F	M	F	M	F
	(i) Common Diseases						
1.	Fever/Flu	1.43 (72)	1.39 (69)	1.50 (88)	1.40 (78)	1.47 (160)	1.39 (147)
2.	Body Aches	1.33 (28)	1.38 (17)	1.43 (65)	1.33 (42)	1.38 (93)	1.36 (59)
3.	Diahorrea	Nil	Nil	1.00 (16)	1.00 (18)	0.50 (16)	0.50 (18)
4.	Gastroenteric disease	0.66 (3)	Nil	Nil	Nil	0.33 (3)	Nil
5.	Skin disorder	1.00 (3)	0.33 (3)	1.00 (5)	1.00 (2)	1.00 (8)	0.67 (5)
6.	Reproductive disorder	0.33 (1)	Nil	Nil	Nil	0.17 (1)	Nil
	(ii) Special Ailments						
7.	Cardiac failure	0.66 (2)	Nil	1.00 (3)	1.00 (2)	0.83 (5)	0.5 (2)
8.	TB	Nil	Nil	1.00 (1)	Nil	0.50 (1)	Nil
9.	Anaemia	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	1.00 (1)	1.00 (1)	0.5 (1)	0.5 (1)
11.	Blood Pressure	Nil	Nil	1.00 (5)	1.00 (3)	0.5 (5)	0.5 (3)
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	0.33 (2)	Nil	Nil	Nil	0.17 (2)	Nil

Figures in parentheses indicate the number of incidence in families,
(others include Thyroid, Sinus)*

(v) Incidence of diseases among Adult (male and female) previous occurrence

The previous occurrence of diseases among adults (male and female) based on the number of months is discussed in Table 3.12.

The most common diseases prevalent among the respondent families were fever and body ache. On an average most recent occurrence of fever/flu was found among female members of the respondent families was 1.56 months and it was 1.49 months among male members.

In the case of body ache the previous occurrence was found in 1.75 months in males and 1.33 months ago in females. Occurrence of diahorrea was seen among male members and female with a previous occurrence of 1.32 and 1.49 months respectively.

The most common special ailments found among the respondents were cardiac failure, and blood pressure etc. Previous occurrence of cardiac failure among the male and female members was found in last month. Incidence of blood pressure was found three month ago in the case of male and 1.60 months ago in case of female respondents.

Table 3.12: Incidence of diseases among - Adult (Male and Female) Previous occurrence (Number of months)

Sl.No.	Diseases	Districts					
		Kerala		Tamil Nadu		Total	
		M	F	M	F	M	F
	(i) Common Diseases						
1.	Fever/Flu	1.77	1.82	1.20	1.30	1.49	1.56
2.	Body Aches	1.26	1.42	2.23	1.23	1.75	1.33
3.	Diahorrea	0.33	1.33	2.30	1.65	1.32	2.77
4.	Gastroenteric disease	0.33	Nil	Nil	Nil	0.17	Nil
5.	Skin disorder	1.00	0.66	4.25	4.50	2.63	2.58
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil
	(ii) Special Ailments						
7.	Cardiac failure	0.66	Nil	1.00	1.00	0.83	0.5
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anaemia	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	6.00	3.20	3.00	1.60
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	0.5	0.33	Nil	Nil	0.25	0.17

Figures in parentheses indicate the number of incidence in families,
(others include Thyroid, Sinus)*

(vi) Incidence of diseases among children (Male and Female) - Annual frequency

The annual frequency on the incidence of diseases among children (Male and Female) is furnished in Table 3.13.

Table 3.13 Incidence of diseases among children (Male & Female) Annual frequency

Sl.No.	Diseases	Districts					
		Kerala		Tamil Nadu		Total	
		M	F	M	F	M	F
	(i) Common Diseases						
1.	Fever/Flu	1.43 (72)	1.39 (69)	1.50 (88)	1.40 (78)	1.47 (160)	1.39 (147)
2.	Body Aches	1.33 (28)	1.38 (17)	1.43 (65)	1.33 (42)	1.38 (93)	1.36 (59)
3.	Diahorrea	Nil	Nil	1.00 (16)	1.00 (18)	0.50 (16)	0.50 (18)
4.	Gastroenteric disease	0.66 (3)	Nil	Nil	Nil	0.33 (3)	Nil
5.	Skin disorder	1.00 (3)	0.33 (3)	1.00 (5)	1.00 (2)	1.00 (8)	0.67 (5)

6.	Reproductive disorder	0.33 (1)	Nil	Nil	Nil	0.17 (1)	Nil
	(ii) Special Ailments						
7.	Cardiac failure	0.66 (2)	Nil	1.00 (3)	1.00 (2)	0.83 (5)	0.5 (2)
8.	TB	Nil	Nil	1.00 (1)	Nil	0.50 (1)	Nil
9.	Anaemia	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	1.00 (1)	1.00 (1)	0.5 (1)	0.5 (1)
11.	Blood Pressure	Nil	Nil	1.00 (5)	1.00 (3)	0.5 (5)	0.5 (3)
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	0.33 (2)	Nil	Nil	Nil	0.17 (2)	Nil

Figures in parentheses indicate the number of incidence in families,
(others include Brain disorder)*

Major diseases found among the children in the study area were fever/flu, body ache, diarhorrea, gastro enteric disease, skin disorder etc in which fever was the most popular disease found among the children and it was distributed across both the coastal states. The average frequency of fever among male children was 1.88 times per year and a total of 52 male children were affected by fever across the surveyed area. In the case of female children a total number of 54 were affected by fever with an average annual frequency of 1.52 times per year. In Ramanathapuram district of Tamil Nadu, 55 children of the respondents were severely affected by malaria fever.

Body ache was found to be more among females with an average frequency of 0.63 times per year and 10 children of the respondents were affected by body ache. In the case of male members, 8 members were affected by body ache with an average annual frequency of 0.43.

Diahorrea was found commonly among male members with an average frequency of 0.50 times per year and two male children were affected by diahorrea.

There weren't any reported cases of special ailments found among the families of respondents across both the states. It is quite interesting to note that the respondent household's children were not affected with life style diseases. There was not even a single child member with special ailments or life style diseases like diabetics, blood pressure and AIDS.

(vii) Incidence of diseases among Children - Previous occurrence

The previous occurrence of diseases among children based on the number of months is discussed in Table 3.14.

The most common diseases prevalent among the children of the respondent families were fever and body ache. On an average most recent occurrence of fever/flu was found among male children of the respondent families was 2.18 months and it was 2.50 months

among female children .In the case of body ache the previous occurrence was found in 1.02 months in males and 1.13 months ago in females. Occurrence of diahorrea and skin disorder was seen among male children and female with a previous occurrence of 0.83 and 0.17 months respectively.

Table 3.14: Incidence of diseases among - Children (Male and Female) Previous occurrence (Number of months)

Sl.No.	Diseases	Districts					
		Kerala		Tamil Nadu		Total	
		M	F	M	F	M	F
	(i) Common Diseases						
1.	Fever/Flu	1.36	1.5	3.00	3.50	2.18	2.50
2.	Body Aches	0.33	0.66	1.70	1.60	1.02	1.13
3.	Diahorrea	Nil	0.33	1.65	Nil	0.83	0.17
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil
	(ii) Special Ailments						
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anaemia	0.33	Nil	Nil	Nil	0.17	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil

(viii) Access to health care

The access to health care is also an important parameter which determines the continued health of the fisherfolk. Often the distance leads to the non treatment or its delay. The access to health care was measured using the distance required to avail the same. (Table3. 15). The results indicate that there exists considerable access to the primary health centre and hospital. On an average the primary health centre was available at a distance of 1.67 km and the hospital at 4.38 km. The average distance for the primary health centre ranged from 1.21 km in Kerala to 2.12 km in Tamil Nadu.

Table 3.15: Access to health care (km)

Sl.No.	States	Primary Health Centre	Hospital
1.	Kerala	1.21	2.26
2.	Tamil Nadu	2.12	6.50
3.	Average	1.67	4.38

(ix) Problems in health management

The major problems underwent in health management was analyzed based on the opinion of the sample respondents. The major reasons cited by the respondents are indicated in Table 3.16. The major reasons suggested include drinking water problem (35.11 per cent), problems on cleanliness/sanitation (22.22 per cent), non availability of specialist and paramedicines in health centers (17.78 per cent), lack of adequate effective medicines (12.44 per cent) and, poor infrastructure (9.78 per cent).

The state level analysis of the sample respondent households indicated that the non availability of specialist and paramedicines in health centers and poor access to safe drinking water was the major problems perceived by the respondents in Kerala.

Table 3.16: Problems in health management (Frequency)

Sl.No.	Problems	States		
		Kerala	Tamil Nadu	Total
1.	Non availability of specialist and paramedicines in health centers	18 (14.40)	22 (22.00)	40 (17.78)
2.	Poor infrastructure	9 (7.20)	13 (13.00)	22 (9.78)
3.	Lack of adequate effective medicines	10 (8.00)	18 (18.00)	28 (12.44)
4.	Problems on Cleanliness/ Sanitation	17 (13.60)	33 (33.00)	50 (22.22)
5.	Drinking water problem	1 (0.80)	78 (78.00)	79 (35.11)

Figures in parentheses indicate percentage to total respondents
Number of respondents who had opined on the same

(x) Suggestions to improve healthcare facilities

The respondent households opined on the different suggestions for improving the health care facilities and the details are furnished in Table 3.17. The major suggestions cited by the respondents includes the following; increasing the number of doctors/specialists, construction of quarters facility for doctors so that they are available 24 x 7, providing available sufficient medicines for all diseases with free of cost, construction of the modern hospital with all infrastructure and healthcare facilities, provision of ambulance for emergency (especially during delivery accidents, etc.) and providing good drinking water facility.

It was found that the most important suggestion which was opined by the respondent of both the states was providing good drinking water facility(43.11) followed by construction of the modern hospital with all infrastructure and healthcare facilities (30.07 per cent), increasing the number of doctors/specialists (23.75 per cent)and to provide available sufficient medicines for all diseases with free of cost(16.11 per cent).

Table 3.17: Suggestions to improve health care facilities (Frequency)

Sl. No.	Suggestions	States		
		Kerala	Tamil Nadu	Total
1.	Increase the number of doctors/specialists	10(8.00)	15(15.00)	25 (11.11)
2.	Make quarters facility for doctors so that they are available 24 x 7	3(2.40)	4(4.00)	7 (3.11)
3.	Make available sufficient medicines for all diseases with free of cost	12(9.60)	18(18.00)	30 (13.33)
4.	Construct the modern hospital with all infrastructure and health care facilities.	41(32.80)	38(38.00)	79 (35.11)
5.	Provide ambulance for emergency (especially during delivery accidents, etc.)	18(14.40)	8(8.00)	26 (11.56)
6.	Need good drinking water facility	19(15.20)	78(78.00)	97 (43.11)

Figures in parentheses indicate percentage to total respondents
Number of respondents who had opined on the same

(D) Income status of respondent households

The income profile of the respondent households are analyzed using income patterns, respondents involvement in non fisheries activities and expenditure pattern. In addition the indebtedness and savings were analyzed using details on savings, indebtedness , sources of lending organization, purpose of availing loan and suggestions for enhancing the income and employment generation.

(i) Monthly Income

The income pattern of the respondent household was analyzed using the monthly income across the both states of India (Table 3.18).

The major income sources of the respondent households comprised of income from fishery (mariculture), business, agriculture, labour services and other service sectors. The highest monthly average income generated by the total respondents across both the states was through fisheries sector with an average amount of Rs.9440.52 (69.31 per cent of the total income) followed by income from labour sector at Rs.3570.00 (26.21 per cent) , agriculture at Rs 350.00 (2.57 per cent)and business sector at Rs 171.93 (1.26 per cent).

The state wise monthly income status of the respondents indicated that Tamil Nadu has the highest income from fisheries (mariculture) sector which contributed to 80.35 per cent of the total income. In Kerala the income from labour sector was near to fishery sector which contributed to 39.68 per cent of the income.

Table 3.18:Monthly income status of the respondents (Rs.)

Sl. No.	States	Enterprise					
		Fishery	Labour	Agriculture	Business	Any others	Total
1.	Kerala	3800.52 (57.56)	2620.00 (39.68)	-	93.36 (1.41)	88.00 (01.33)	6601.88 (100.00)
2.	Tamil Nadu	5640.00 (80.35)	950 (13.54)	350 (4.99)	78.57 (1.12)	-	7018.57 (100.00)
3.	Total	9440.52 (69.31)	3570 (26.21)	350 (2.57)	171.93 (1.26)	88.00 (0.65)	13620.45 (100.00)

Figures in parentheses indicate percentage to total

(ii) Involvement in non fisheries activities

The Involvement of respondent' households in non fisheries activities are illustrated in the Table 3.19.

The analysis on the respondent household's involvement in the non fisheries activities indicated that 31.56 per cent of the total respondents were involved in non-fisheries activities, which provided an additional source of income. The respondents involved in non-fishing activities were more in Tamil Nadu (34.00 per cent) than Kerala (29.60 per cent). The major non fishing activities involved by respondents were labour, business, agriculture, and other service sectors with a contribution of 24, 5, 9 and 3 per cent respectively. The total number of respondents involved in business was 2.22 per cent. In Kerala 24.80 per cent of the respondents involved in labour activities which might be due to more employment opportunity and higher wage rate prevailing in the state. The result clearly indicated the existence and practice of alternative livelihood option holds good in the selected respondent households.

Table 3.19: Respondents involvement in non-fisheries activities

Sl. No.	States	Respondents involved in non-fisheries activities				
		Labour	Agriculture	Business	Any others	Total
1.	Kerala	31 (24.80)	-	3 (2.40)	3 (2.40)	37 (29.60)
2.	Tamil Nadu	23 (23.00)	9(9.00)	2 (2.00)	-	34 (34.00)
3.	Total	54 (24.00)	9 (4.00)	5 (2.22)	3 (1.33)	71 (31.56)

Figures in parentheses indicate percentage to total

(iii) Pattern of expenditure

The major household expenses measured include expenditure on food, clothing, fuel, medical, education, entertainment, personals and durables. The result of the pattern of monthly expenditure is represented in Table3. 20.

The average monthly expenditure pattern of the 225 households worked out was Rs 6370.40 with a share of Rs 2341.38 (36.75 per cent) on food and Rs1916.10 (30.08 per cent) on personal. The least expenditure was Rs.491.32 (3.86 per cent) to purchase consumer durables.

The total expenditure pattern of the selected states indicates that the highest household expenditure was noticed in Tamil Nadu with an average amount of Rs. 6743.49 followed by Kerala with Rs 5997.32.

Table 3.20: Monthly expenditure pattern of fisher family (Rs)

Sl. No.	States	Items								
		Food	Cloth-ing	Fuel	Medi-cal	Edu-cation	Enter-tain-ment	Per-sonal	Dura-bles	Total
1.	Kerala	1841.32 (30.70)	607.52 (10.12)	380.40 (6.34)	329.72 (5.49)	330.92 (3.82)	229.32 (3.82)	2040.80 (34.03)	237.32 (3.95)	5997.32 (100.00)
2.	Tamil Nadu	2841.43 (42.14)	351.40 (5.21)	300.23 (4.45)	464.30 (6.89)	490.60 (7.28)	250.13 (3.71)	1791.40 (26.56)	254.00 (3.77)	6743.49 (100.00)
3.	Total	4682.75 (36.75)	958.92 (7.53)	680.63 (5.34)	794.02 (6.23)	821.52 (6.45)	479.45 (3.76)	3832.20 (30.08)	491.32 (3.86)	12740.81 (100.00)

Figures in parentheses indicate percentage to total

(iv) Indebtedness and Savings

The indebtedness and savings of the respondent households are indicted in Table 3.21.

The saving details of the respondent's household indicated that 76.89 per cent of the respondents have no savings. 14.22 per cent of the respondent households possessed a saving of less than Rs 50000. 14.22 per cent of the respondents have a saving of Rs 50000-100000. Around 1.78 per cent of the respondent households had a savings of more than a lakh rupee. The details on the frequency of respondents having saving across both the coastal states is graphically represented in Fig. 3.3.

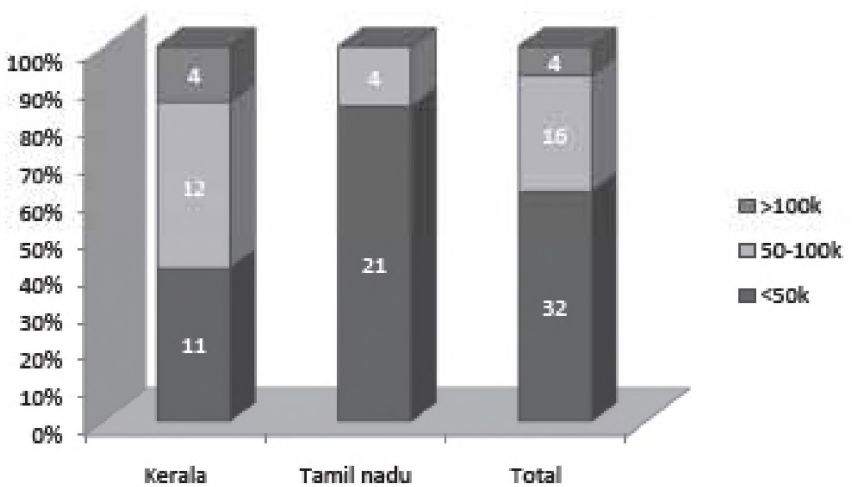


Fig. 3.3: Distribution of respondents based on savings

It was found that the frequency of respondents possessing savings was almost similar in both the states.

Table 3.21: Savings details of respondent households (Number)

Sl. No.	States	Frequency of respondents having Savings				Total
		Nil	< 50 k	50-100.00k	>100.00K	
1.	Kerala	98 (78.40)	11 (8.80)	12 (9.60)	4 (3.20)	125 (100.00)
2.	Tamil Nadu	75 (75.00)	21 (21.00)	4 (4.00)	-	100 (100.00)
3.	Total	173 (76.89)	32 (14.22)	16 (7.11)	4 (1.78)	225 (100.00)

Figures in parentheses indicate percentage to total

(v) Indebtedness of the respondents households

The lack of savings and increased expenditure for mere sustenance often lead to indebtedness. The pattern of indebtedness of respondent households across the different coastal states of India is discussed in Table 3.22.

The results indicated that the average amount of indebtedness per person was Rs 29931.85 in which the highest average amount of indebtedness was recorded in Kerala with Rs 34133.30. The highest number of respondents who borrowed money for different purposes was found in Tamil Nadu with 48.00 per cent followed by Kerala with 42.40 per cent. The average amount of loan repayment was Rs 5945.27(19.86 per cent). Nearly 80.00 per cent of the amount has to be repaid by the respondent household of both states.

Table 3.22: Indebtedness of respondent's households (Rs.)

Sl. No.	States	Frequency of respondents having Savings		
		Number of persons	Average Amount per person	Average Repayment paid
1.	Kerala	53 (42.40)	34133.30	5689.93 (16.66)
2.	Tamil Nadu	48 (48.00)	25730.40	6200.60 (24.09)
3.	Total	101 (44.89)	29931.85	5945.27 (19.86)

Figures in parentheses indicate percentage to total

(vi) Sources of lending

The indebtedness often results in availing loans from the different institutions. The major sources of lending include banks, co-operatives, private money lenders, friends/relatives and jewel loans. The details of the sources of money lending as availed by the respondent households is furnished in Table 3.23.

A total of 102 respondents had availed loans for various purposes. It was found that banks constituted the major source of loans with more than 17.78 per cent of the respondent households availed the credit. Cooperative provided credit to 30 respondents in Kerala and constituted 13.33 per cent of the total respondents. Private money lenders provided loan to 9.33 per cent of the respondents.

Table 3.23: Sources of lending

Sl. No.	Sources	States		
		Kerala	Tamil Nadu	Total
1.	Banks	12 (9.60)	28 (28.00)	40 (17.78)
2.	Co-operative	30 (24.00)	-	30 (13.33)
3.	Private money lenders	11(8.80)	10 (10.00)	21 (9.33)
4.	Friends / Relatives	-	-	-
5.	Jewel loans	1 (0.80)	5 (5.00)	6 (2.67)
6.	Others (SHGs)	-	5 (5.00)	5 (2.20)

Figures in parentheses indicate percentage to total

(vii) Purpose of availing loans

The details on the purpose of availing loans and number of loans availed by the respondent households are indicated in Table 3.24.

The major purposes for which loans were availed included purchase of craft/gear and other fishing related equipment/seaweed farming, house construction/land purchase, marriage expenses., education, health and social security.

Loans were mainly availed for purchase of gears and other fishing related equipments, seaweed farming etc. It was found that of the 102 respondents who availed loans, 13.78 per cent was availed for the purpose of purchase of gears and other fishing related equipment and seaweed farming. House construction and land purchase was the reason for getting loan for 18.22 per cent of the respondent households. Other expenses like business and purchase of vehicle also was the reason for taking loan for 1.33 per cent. Marriage expenses assumed a major purpose of loan for 4.89 per cent of the respondent households. 28.00 per cent of the respondent households in Tamil Nadu availed loan for seaweed farming, whereas similar per cent of respondent households in Kerala availed loan for house construction and land purchase.

Table 3.24: Purpose of availing loans (Number.)

Sl. No.	Purpose	States		
		Kerala	Tamil Nadu	Total
1.	Purchase of craft/gear and other fishing related equipments/seaweed farming	3(2.40)	28(28.00)	31 (13.78)
2.	House construction / Land purchase	36(28.80)	5(5.00)	41 (18.22)
3.	Marriage expense	5(4.00)	6(6.00)	11 (4.89)
4.	Education	4(3.20)	4(4.00)	8 (3.56)
5.	Health and Social Security	5(4.00)	3(3.00)	8 (3.56)
6.	Any others (business and purchase of vehicles)	-	3(3.00)	3 (1.33)

Figures in parentheses indicate percentage to total

(viii) Suggestions to enhance the income and employment generation

The percentage response of the respondents' suggestions for enhancing the income and employment generation by fishermen is indicated in Table 3.25.

The major suggestions perceived by the households included arranging the institutional financial support like micro credit for fisherfolk; SHG, etc, regulation of fish marketing through institutional interventions; vocational training for fisherwomen to undertake house hold income activities during dry/off season; regulation of PDS and supply of the basic food items and fuel(like kerosene, LPG, etc) by the Govt. agencies and provision of rural infrastructure for general societal / human development.

The percentage response of the respondents indicated that 27.56 per cent of the respondents felt that arranging the institutional financial support like micro credit for fisheries, SHG, etc can provide a major impetus in enhancing the income and employment generation by fisherfolk in mariculture followed by the regulation of fish/seaweed/mussel marketing through institutional interventions (14.22 per cent). The opinion on provision of rural infrastructure for general societal / human development was 12.44 per cent.

Table 3.25: Suggestions for enhancing the income and employment generation by fishermen (Percentage response)

Sl. No.	Suggestions	States		
		Kerala	Tamil Nadu	Total
1.	Arranging the institutional financial support like micro credit for fisheries, SHG, etc	27 (21.60)	35 (35.00)	62 (27.56)
2.	Regulation of fish/seaweed/mussel marketing through institutional interventions	14 (11.20)	18 (18.00)	32 (14.22)
3.	Vocational training for fisherwomen to undertake house hold income activities during dry/ off season	19 (15.20)	9 (9.00)	28 (12.44)
4.	Regulation of PDS and supply of the basic food items and fuel(like kerosene ,LPG etc) by the Govt. agencies	-	5 (5.00)	5 (2.22)
5.	Provisional of rural infrastructure for general societal / human development	-	5 (5.00)	5 (2.22)

Figures in parentheses indicate percentage to total

Figure 3.4: Kappaphycus alvarezii farming site
at Palk Bay region of Ramanathapuram district of Tamil Nadu.

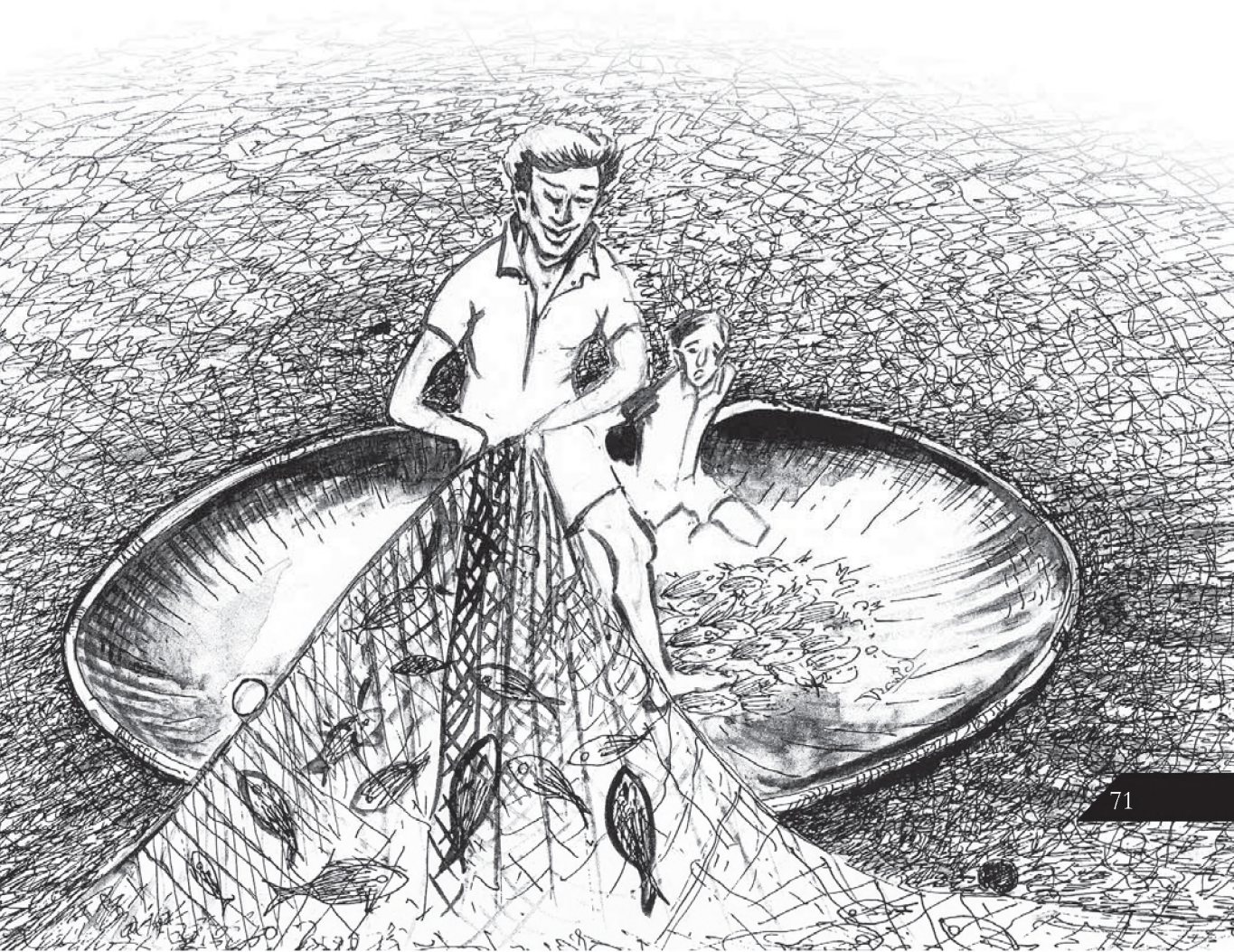
Figure3.5: Women involved in seaweed farming

Figure3.6: Data Collection

Figure 3.7: Kappaphycus fragments ready for seeding

Figure 3.8: Seaweed farmers residing at shore side of Pamban, Palk Bay region of Ramanathapuram district of Tamil Nadu

Inland Fisheries 04



04

Inland Fisheries

Pradeep Katiha, Shyam S. Salim, B.Ganesh Kumar, Nagesh Kumar Barik, R.Narayanakumar, M.Krishnan, Nikitha Gopal, K.Ponnusamy

Introduction

The Indian fisheries date back to time immemorial, but, the saga of success has been related to early post independence years. With renewed accent on optimum utilization of country's aquatic wealth for fisheries, the Government of India earmarked an ambitious programme of mechanization and modernization through upgradation of technology during early fifties. Therefore, Indian fisheries witnessed impressive transformation from a highly traditional rural activity to technologically sound well developed industry.

Indian fisheries sector has growing steadily from the first plan onwards with the annual fish production of 0.754 million tonnes during 1950-51 to the level of 9.57 million tonnes during 2012-13.

Contribution of the sector to agriculture and national GDP increased steadily over the past years. The GDP of fisheries sector reached at Rs. 78,000 crore during 2012-13 from about Rs. 9,000 crore during 1993-94. Currently, fisheries contribute 0.83 per cent to national GDP of the country and 4.74 per cent of agricultural and allied activities.

The paradigm shifts in Indian fisheries

During the last decade paradigm shift from marine fisheries to inland fisheries in terms of production became clear. Further increasing contributions from aquaculture over fisheries during last two and half decades in inland sector established freshwater aquaculture as major contributor to Indian fisheries. The encouraging signals of growing inland culture-based fisheries in reservoirs and flood plain wetlands and mariculture are observed during XI plan (Katiha 2009, 2009 a, b). Diversification has been significant at all stages from production to consumption. It is from food fish to ornamental fish, carp to catfish, coastal fisheries to deep sea fisheries, exportable items (from shrimp to a variety of products) and from domestic to overseas markets of number of countries.

The inland fisheries resources

Indian inland waters include rivers, reservoirs, aquacultural waters (ponds and tanks), estuaries and flood plain lakes. Since, aquacultural waters are covered under other chapter; the brief status of inland open waters in the country is described below.

Rivers

The river systems of India may be classified into two major groups, namely, Himalayan or extra-peninsular rivers and peninsular rivers (Sinha and Katiha, 2001). The general profile of these groups is mentioned below.

The Himalayan or Extra-Peninsular Rivers

Originating from the Himalayas to transverse great alluvial Indo-Gangatic plains, these snow and rainfed rivers are characterised by complicated flood regimes and seasonal variations in volume of flow. Descending on the plains, they become sluggish and inundate vast land area. These rivers may be categorised into three systems, the Ganga, the Brahamputra and the Indus. The Ganga river system has a combined length of 12500 kms and a catchment area of 97.6 million ha. The Ganga, Ghagra, Gomti, Ramganga, Kosi, Gandak, Yamuna, Chambal, Sone and Tons are the major rivers of this system. These rivers are spread over most of the north Indian states (except the hilly states) to extend upto West Bengal through Bihar. In the upland waters the commercial fisheries is virtually absent, due to inaccessible terrain and other exploitation problems. The stretch of river Ganga from Haridwar to Lalgola is recognised as one of the richest source of fisheries in India, comprising highly priced major carps, hilsa and catfishes. Mid September to June are peak months for fishing. During lean period of monsoon months the fishing activities are generally confined to river banks.

Fig. 4.1 River Yamuna

The combined length of the Brahamputra river system is 4023 km. with catchment area of 51 million ha. Originating from Tibet, the river flows through northern slopes of Himalayas to enter India at north-east corner of Arunachal Pradesh. It has 918 km stretch in India, including 730 km only in Assam. Its northern tributaries Subansiri, Kameng and Manas are large with steep, shallow-braided channels, whereas those on the southern bank,

Buri Dihing, Dhansiri and Kopilli are deeper with meandering channels and low gradient. The Brahamputra vally is marked for its abandoned river beds (beels) supporting rich fishery. Catfishes, and major and minor carps dominate the commercial catches of upper middle and lower stretches, while the commercial catch in lower-middle stretch primarily composed of catfish and miscellaneous catch.

In case of the Indus river system, main Indus and its tributaries in upper, Beas and Sutlej in the lower reaches are important from Indian fisheries viewpoint. Its headwaters in the states of Kashmir, Himachal Pradesh and Punjab mainly harbour mahseer, snow trout, some cyprinids and exotic trouts. The rivers Beas and Sutlej contain indigenous carps and catfishes, which are commercially exploited.

Fig. 4.2 Brahamputra river

The Peninsular Rivers

The torrential and rain fed, peninsular rivers have well defined stable course. These include two river systems, the East Coast and the West Coast. The East Coast river system has vast expanse of water in the states of Orissa, Madhya Pradesh, Maharastra, Andhra Pradesh, Karnataka and Tamil Nadu. This river system mainly has four constituent rivers; the Mahanadi, the Godavari, the Krishna and the Cauvery have a combined length of 6437 km and catchment area of 121 million ha. This system drains entire Peninsular India and east of Western Ghats in the west and south parts of central India. Besides its own fish fauna of several carps, catfishes, murrels, and prawn, the system is repeatedly enriched by transplantation of Gangatic carps.

The combined length of rivers of West Coast river system and catchment area are 3380 km and 69.16 million ha, respectively. The Narmada and the Tapti are the longest rivers of system along with 600 small rivers. Its rivers are distributed in the states of Gujarat, Maharashtra and Madhya Pradesh. The fish fauna of the system consists of carps, catfishes, mahseers, prawns, etc.

The riverine resources has major share in inland capture fish production. But, during past few decades riverine ecosystem witnessed marked alterations, due to mammoth human interventions in the form of water abstraction, dam construction, sedimentation, and irrational fishing. These have discerningly disturbing affect on natural riverine fish production, which showed continuous declining trends. The fisheries of anadromous hilsa have declined by 96

per cent above Farakka after construction of Farakka barrage in 1974. These examples of Ganga river system may be extended to depict the status of fish production in all the rivers of India. The restoration of riverine fisheries would entail an integrated approach encompassing the requirements of fisheries along with other uses of land and water. It will help to uplift the socio-economic status of riparian fishers.

Reservoirs

During post independence period, large number of river valley projects created a chain of impoundments, which are highly amenable for fishery activities. These manmade water bodies created by obstructing the surface flow, by erecting a dam of any description, on a river, stream or any water course are called reservoirs (Sugunan, 1995). These are generally classified into small (<1000 ha), medium (1000-5000 ha) and large (>5000 ha). The area under these water bodies is on a continuous increase by adopting more and more reservoirs for fisheries. At present in India total area under reservoirs is 3.15 million ha, out of which small reservoirs occupy 1.49 million ha followed by large 1.14 million ha and medium 0.52 million ha. Among the states, maximum percentage area under reservoirs is in Madhya Pradesh (14.6) followed by Andhra (14.54), Karnataka (13.87) and Tamil Nadu (11.38).

Among different sized reservoirs, maximum annual production was from small reservoirs (49.9 kg/ha) followed by medium (12.3 kg/ha) and large 11.43 (kg/ha) with overall average of 20.13 kg/ha in mid nineties. Despite the amenability for fish production and a production potential in the range of 50-300 kg/ha, the present yield from reservoirs in India was very

Fig. 4.3 Reservoir in Uttar Pradesh

low (Katiha, 2007). The large and medium reservoirs are generally managed as stocking cum capture fisheries resources. The management policies based on norms of stock manipulation through selective stocking and harvesting operations have been suggested to rectify the imbalances in species spectrum and to increase fish yield. For small reservoirs, culture based management is considered the best. During XI Five Year Plan under a massive Reservoir Fisheries Development Programme of NFDB, the reservoirs were stocked in most of the states of country. An assessment of impact of this programme indicated the fish yield from

small reservoirs at 174 kg/ha and overall 110 kg/ha (Katiha et al., 2011). The potential of reservoir fisheries is estimated as follows

Table 4.1 Projected fish yield from reservoirs

Sl. No.	Category	Area (lakh ha)	Yield (kg/ha) (1994-95)	Yield (kg/ha) (2010)*	Targeted yield (2017) (kg/ha)	Yield gap (kg/ha)
1.	Small	14.9	50	174	250	76
2.	Medium	5.3	12	94	125	31
3.	Large	11.4	11	33	50	17
4.	Total	31.5	30	110	166	56

Table 4.2 Projected fish production from reservoirs

Sl. No.	Category	Area (lakh ha)	Production (1994-95) (lakh t)	Production (2010) (lakh t)	Targeted production (2017) (lakh t)	Expected increase (lakh t)
1.	Small	14.9	0.74	2.59	3.73	1.14
2.	Medium	5.3	0.07	0.50	0.66	0.16
3.	Large	11.4	0.13	0.38	0.86	0.48
4.	Total	31.5	0.94	3.47	5.25	1.78

Estuaries

The estuarine capture fishery forms an important component of inland fisheries. The open estuarine system includes Hoogly-Matlah and Mahanadi estuarine systems. Godavari estuary is the main estuary of peninsular India, with Adyar Mankanam and Mandovi as other estuaries and Chilka, Pulicat and Vembanad as important brackish water lagoons (Katiha 2002a, b). These estuaries and lagoons are recognised as excellent sources of naturally occurring fish and prawn seed. The fisheries of the estuaries are considered as above the subsistence level. The average yield varies between 45-75 kg/ha.

Flood plain lakes

India has extensive flood plains in the form of oxbow lakes (mauns, beels, chaurs and jheels) especially in the states of Assam, Bihar and West Bengal. These are shallow, nutrient rich water bodies formed due to change in course of the river. Some of these retain connection with the main river, at least in monsoons, while others have lost it permanently. Due to their high production potential these are adopted for aquaculture based capture fisheries. The areas having river connections can be exploited optimally by keeping the deeper central zones exclusively for capture fisheries and renovating the marginal pockets for culture fisheries. The fish yield and production potential of these waters is mentioned below:

Fig. 4.4 Floodplain wetland with katal in Assam

Table 4.3 Projected fish yield from the floodplain wetlands

Sl. No.	States	Area (lakh ha)	Yield (kg/ha) 2000-01	Yield (kg/ha) (2010)	Targeted Yield (2017) (kg/ha)	Yield gap (kg/ha)
1.	West Bengal	0.43	225	500	2000	1500
2.	Bihar	0.40	120	250	500	250
3.	Assam	1.00	150	400	1200	800
4.	Uttar Pradesh	1.52	175	320	900	580
5.	N.E. States	0.19	75	150	500	350
6.	Total	3.54	162	347	1050	703

Table 4.4 Projected fish production from the floodplain wetlands

Sl. No.	Category	Area (lakh ha)	Production in 2000-01 (lakh t)	Production (2010) (lakh t)	Projected (2017) (lakh t)	Expected increase (lakh t)
1.	West Bengal	0.43	0.10	0.21	0.85	0.64
2.	Bihar	0.40	0.05	0.10	0.20	0.10
3.	Assam	1.00	0.15	0.40	1.20	0.80
4.	Uttar Pradesh	1.52	0.27	0.49	1.37	0.88
5.	N.E. States	0.19	0.01	0.03	0.10	0.07
6.	Total	3.54	0.57	1.23	3.72	2.49

Inland capture fishery is a labour intensive activity, represented mainly by traditional fishers, fishing in natural community or common property waters, while the aquaculture in the country witnessed an impressive transformation from highly traditional activity to well developed industry. The sector has vast production potential particularly for inland aquaculture and culture-based fisheries resources. It showed an average growth of 4.43 per cent over the plan periods. Inland fishery sector has grown steadily to about 1.1 million tonnes within 2010-11 (Ayyappan, 2011). Although, evolved as a livelihood activity, fisheries sector in India had made rapid changes and transformed itself favouring aquaculture, but the importance of inland fisheries is still recognised due to the major source of original fish germplasm and

extensive livelihood, food and nutritional support to rural populace in the country (Katiha, 2009).

The central and state governments have taken number of steps to improve fish production and productivity, and to organise the fishermen community and initiate schemes for their development. These resulted in formation of 16818 primary fisheries co-operatives, 113 district/regional level federations, 21 state level federations and one national level federation. The primary co-operative societies have above 22.7 lakh members (Mishra, 2011). Number of schemes/organisations aimed at improving fish production and productivity through horizontal or vertical expansion, and increase in adoption of improved technologies. Despite these sincere efforts, production from fishery waters is much below potential, and for some of the capture fishery resources, it is declining. The impact of fisheries developmental activities could not be realised as per expectations due to the very nature of resource under use, which has multiple water use rights and may be designated as common pool resource (CPR). Furthermore, most of the fishing waters belong to state governments, except some under the private property right. The government authorised various agencies to manage the fishery activities in these waters. It also led to exploitation of the fishers. Till date no comprehensive investigation has been done to study the fisher community of inland open waters of rivers, reservoirs, floodplain wetlands and estuaries, the studies conducted are in piece meal (Sinha and Katiha, 2001). In this context, it is pertinent to have an in-depth study of their socio-economic conditions to have better idea of demographic pattern, literacy, health, employment and income status of this poor community. With this background, present study is planned and implemented in different states of the country.

Scope of the study

The study will provide a framework for drawing suitable programmes for the upliftment of traditional fisher folk with particular focus on their literacy, health, employment and income profiling. In short, the study will be highly useful to researchers, planners and policy makers in overcoming the problems of the socio economic parameters which determines the sustained development of the fisher folk.

Objective

The overall objective of the study is to document the socioeconomic status of fishers in fisheries across the different inland states in India. However the specific objectives are to assess the status of literacy, health and income of inland fishers in India.

Methodology

The study was based on the data collected from primary and secondary sources. The primary data was collected from selected respondents using comprehensive and pre-tested questionnaires. The primary data provided concise, clear, complete, and unbiased information about the respondent. The important variables considered for the study were gender, age, literacy, health, employment income and indebtedness parameters

The inland open waters are distributed all over the country including maritime states. They include rivers reservoirs, floodplain wetlands, estuaries and lakes. The study covered 981 respondent households from twelve states: Andhra Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Jharkhand, Kerala, Madhya Pradesh, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal.

The sampling was done with random sampling method from the selected states, according to the magnitude of particular type of resource in that state. At the second stage important districts and area having the constituent water bodies were selected. Ultimately, the fishers operating in these inland waters were selected to collect the primary data. The study covered all the inland resources, and combined results of all the selected states are presented for study parameters. The total households representing the inland capture fisheries sector is given in Table 4.5, 4.6 & 4.7 and the distribution of the sample household across the country is also indicated in Figure 4.5 and geographical distribution is depicted in Figure 4.6.

Data Collection

Table 4.5 Resource wise distrubution of sample respondents in inland capture fisheries sector

Sl. No	State	Resource	Districts	Sample size
1.	Andhra Pradesh	Reservoir	Warangal, Khammam	52
2.	Assam	River	Kamrup	50
		Wetland	Nagon, Barpeta, Morigaon	50
4.	Bihar	Wetland	Begusarai, Muzzaffarpur	60
4.	Gujarat	Estuary	Surat	46
		River	Surat	50
5.	Himachal Pradesh	Reservoir	Bilaspur	50
6.	Jharkhand	Reservoir	Ranchi, Gumla, Ramgarh, Dhanbad	97
7.	Kerala	Reservoir	Palakkad, Thrissur	51
		Estuary	Alappuzha, Ernakulam, Kottayam	50
8.	Madhya Pradesh	Reservoir	Raisen, Sehore, Bhopal	64
9.	Orissa	Estuary	Khurda	59
10.	Tamil Nadu	Reservoir	Krishnagiri, Pollachi	51
		Estuary	Thiruvallur	50
11.	Uttar Pradesh	Reservoir	Jhansi	50
		River	Allahabad	50
12.	West Bengal	Estuary	South 24 Parganas, Hooghly	51
		Wetland	North 24 Parganas	50
13.	Total			981

Table 4.6 Resource wise distribution of sample

Sl. No.	Resource	Sample size
1.	Reservoir	415
2.	River	150
3.	Wetland	160
4.	Estuary	256
5.	Total	981

Table 4.7 State wise distribution of sample respondents in inland capture fisheries

Sl. No.	State	Sample
1.	Andhra Pradesh	52
2.	Assam	100
3.	Bihar	60
4.	Gujarat	96
5.	Himachal Pradesh	50
6.	Jharkhand	97
7.	Kerala	101
8.	Madhya Pradesh	64
9.	Orissa	59
10.	Tamil Nadu	101
11.	Uttar Pradesh	100
12.	West Bengal	101
13.	Total	981

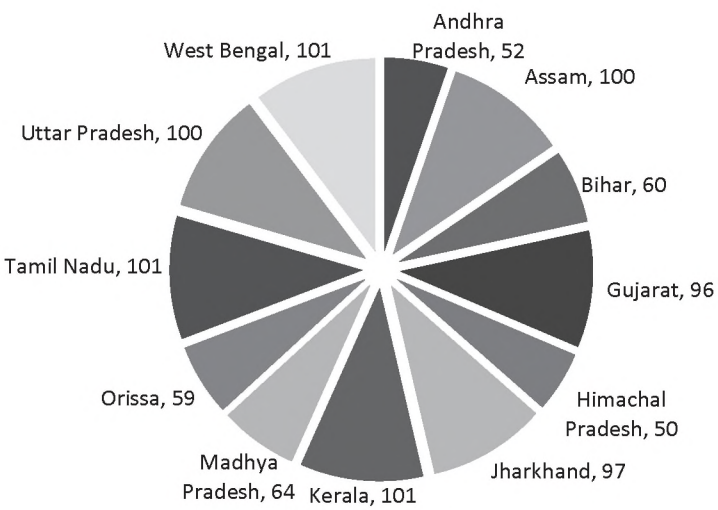


Fig. 4.5 Distribution of sample across states

Fig. 4.6. Geographical distribution of the sampled households

The data collection was done using a pre structured survey schedule (Annexure-I) after a reconnaissance survey from the selected sample respondents. The data was collected on four parameters viz., the general particulars, literacy, health, and income profiling. It covered both urban and rural households and also represented different inland fisheries sectors mentioned above. The data collection was done by the project team in most cases and in some location trained enumerators were employed. The data collected were tabulated and the results were analyzed.

Tools of Analysis

Conventional tools of analysis and percentage analysis was done to process the data and bring out the literacy, income and health status of the fishers in India and to arrive at meaningful conclusions. The data obtained from the respondents were systematically tabulated for the purpose of analysis.

Limitation of the study

The present study relied on primary data collected through the questionnaire survey methodology. The inherent faults and limitations in the primary data collection like respondents' recall bias –due to the absence of proper records on their income, health details, expenditure, savings and indebtedness, etc with the respondents are to be recognized. The information was collected from the respondents based on their memory and experience and the bias cannot be eliminated fully. But in the context of the study, care was taken to avoid personal bias while giving information. Apparent limitations like getting only seasonal information, having data that is for a specified period of time, depending on data that is word of mouth (with its inherent contradictions) as primary data should be considered. The income and expenditure pattern and health parameters of the respondents are subject to change in the short run as well as long run, also need to be considered. This study was confined to the randomly selected states of India.

Results and Discussions

The results and discussions are presented under the following heads

A. General Particulars
B. Literacy Status
C. Health Status
D. Income Status

A. General particulars

The general particulars of respondent's households included age, family size, family composition etc.

(i) Age distribution

The age distributions of the respondent households are furnished in Table 4. 8 and Figure. 4.7.

Table 4.8 Age distribution of the sample respondents (Years)

State	<35	36-55	>56	Total
Andhra Pradesh	15(28.85)	23(44.23)	14(26.92)	52(100.00)
Assam	31(31.00)	42(42.00)	27(27.00)	100(100.00)
Bihar	20 (33.33)	24 (40.00)	16 (26.67)	60(100.00)
Gujarat	42 (43.75)	39 (40.63)	15 (15.63)	96(100.00)
Himachal Pradesh	12(24.00)	29(58.00)	9(18.00)	50(100.00)
Jharkhand	43(44.33)	41(42.27)	13(13.40)	97(100.00)
Kerala	34(33.66)	51(50.50)	16(15.84)	101(100.00)
Madhya Pradesh	33 (51.56)	31(48.44)	0(0.00)	64(100.00)
Orissa	14 (23.73)	36 (61.02)	9 (15.25)	59(100.00)
Tamil Nadu	29(28.71)	61(60.40)	11(10.89)	101(100.00)
Uttar Pradesh	35(35.00)	53(53.00)	12(12.00)	100(100.00)
West Bengal	45(44.55)	26(25.74)	30(29.70)	101(100.00)
Total	353 (35.98)	456 (46.48)	172 (17.54)	981 (100.00)

Figures in parentheses indicate percentage to total of each state

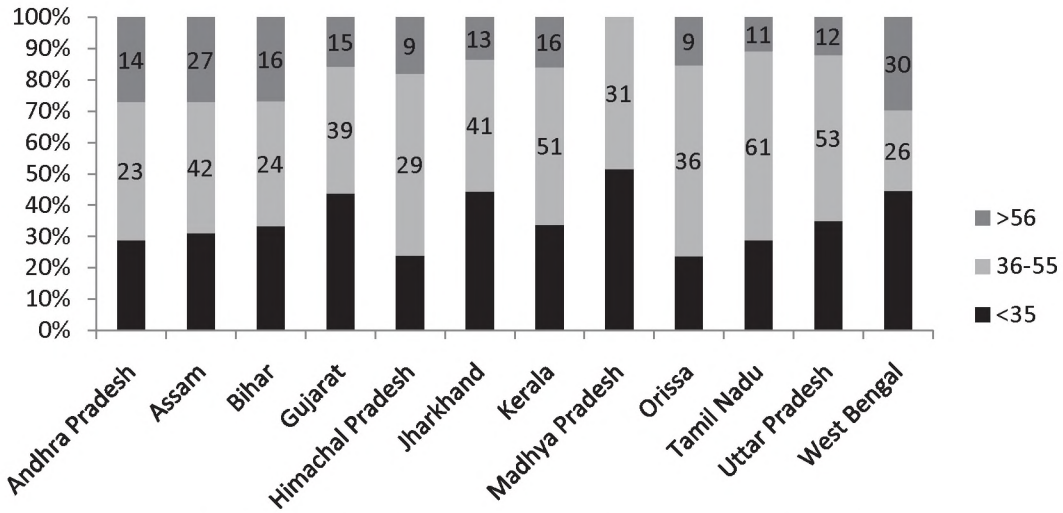


Fig 4.7 Age distribution of the sample respondents (Years)

The age of the respondents are categorized into three sub groups viz, young (15-35 year), middle age (36-55 year), old (>56 year), etc. Fishing continued to be an activity mostly of fisher folk in the age group of 36-55 which constituted about 46.48 per cent of the respondents. The distribution also indicated the representation of young (age less than 35) at 35.98 per cent. The fisher folk with age more than 56 had the least share at 17.53 per cent in total. The continuation of old age fisher folk in fishing indicated the growing complexities of the fishing operation at old age. Considering the low income from this enterprise and high labour and risk, an occupational shift was observed among the younger groups.

Fig 4.8. The young fishermen of the respondent community

The state wise age distribution of the inland fishers indicated that the age group of less than 35 years featured less than average in most of the states Orissa, Himachal Pradesh Tamil Nadu, Andhra, Assam, Kerala and Uttar Pradesh, while higher for the states of Madhya Pradesh, and West Bengal, Jharkhand and Gujarat. It may be also seen that the percentage of younger people involved in active fishing was found to be comparatively less in these states, on account of available alternative avocations and the diminishing popularity of fishing business among the younger generation. In the state of Madhya Pradesh it was heartening to note that younger fishers (>50 per cent) are involved in fishing activities. The percentage of middle aged group fishers was > 40 per cent for most of the states, barring West Bengal (25.74 per cent). It was highest for Orissa (61.02 per cent) followed by Tamil Nadu (60.4 per cent). The old age fishers had highest percentage in West Bengal (29.70 per cent) followed by Assam, Andhra (27 per cent) and Bihar (26.67 per cent). The result also indicated no old fisher in Madhya Pradesh and 10.89 per cent in Tamil Nadu. Interestingly there is not even a single fisherman belonging to old age category in Madhya Pradesh and only a small percent(10.89) belong to the same category in Tamil Nadu

(ii) Family composition

The family composition of the respondents given in Table 4.9 and Figure. 4.9 & 4.10 indicated that the males outnumber the females in most of the inland states except Jharkhand and Kerala, where the male –female ratio was 0.95 and 0.99. The male - female ratio for the entire sample was 1.13 which indicated that for every 1000 females there were 1130 males. It is in parity with the national scenario. The male -female ratio ranged from 0.95 in Jharkhand to 1.27 in West Bengal followed by 1.24 at Himachal and 1.23 at Assam and Orissa.

Table 4.9 Family composition of the respondent households –Male and Female (Number)

Sl. No.	State	House-hold	Male	Female	Total	Male-Female Ratio
1.	Andhra Pradesh	52	126 (51.85)	117 (48.15)	243 (100.0)	1.08
2	Assam	100	270 (55.10)	220 (44.90)	490 (100.0)	1.23
3.	Bihar	60	191 (54.26)	161 (45.74)	352 (100.0)	1.19
4.	Gujarat	96	224 (52.46)	203 (47.54)	427 (100.0)	1.10
5.	Himachal Pradesh	50	125 (55.31)	101 (44.69)	226 (100.0)	1.24
6.	Jharkhand	97	221 (48.79)	232 (51.21)	453 (100.0)	0.95
7.	Kerala	101	224 (49.67)	227 (50.33)	451 (100.0)	0.99
8.	Madhya Pradesh	64	171 (53.44)	149 (46.56)	320 (100.0)	1.15
9.	Orissa	59	165 (55.18)	134 (44.82)	299 (100.0)	1.23
10.	Tamil Nadu	101	197 (52.12)	181 (47.88)	378 (100.0)	1.09
11.	Uttar Pradesh	100	246 (52.56)	222 (47.44)	468 (100.0)	1.11
12.	West Bengal	101	270 (56.02)	212 (43.98)	482 (100.0)	1.27
13.	Total	981	2430 (52.95)	2159 (47.05)	4589 (100.0)	1.13

Figures in parentheses are the percentage to total of each state

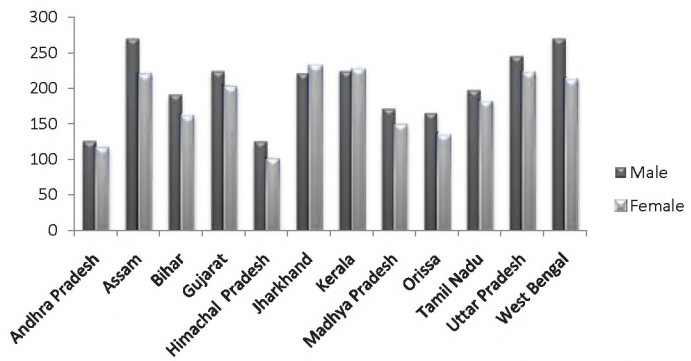


Fig. 4.9. Family composition of the respondent households –Male and Female (Number)

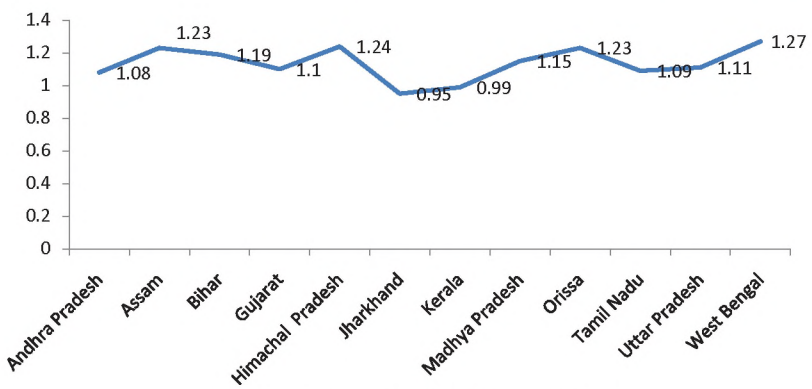


Fig. 4.10. Male-Female ratio for different inland states

(iii) Family size

The small family norm is mostly adopted by the fisher households of India (Table 4. 6 and Figure.4.11).

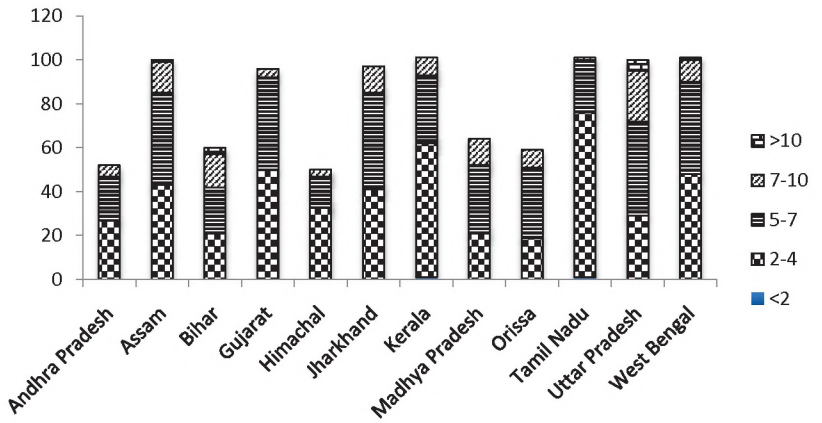


Fig. 4.11. Distribution of sampled households according to family size

The average size of family in India worked out to be 4.68 ranging from 3.74 in Tamil to 5.87 in Bihar. The family type and family size of the respondents exhibited quite similar pattern of distribution in which greater part (87 per cent) of the total respondents were from small to medium family having a size between 2 and 6. It confirmed the shift in family type from joint to nuclear for most of the states. It was found that 47.71 per cent of the respondents belong to the category of family size between 2-4 and about 40 per cent was in family size category of 5-6. The number of families under extreme categories of <2 and >10 were rare at 0.2 and 1.02 per cent of total. The category 7-10 had only 11.71 per cent of total families. The results indicated that large families (>7) were comparatively higher in the states of Bihar (30 per cent) and Uttar Pradesh (28 per cent). On the contrary, nuclear families between 2-4 family members were higher in Tamil Nadu (74.26 per cent) followed by Himachal (66 per cent) and Kerala (60 per cent). The results indicated varied family size for the fisher community across different inland states.

(iv) Age composition

The age composition of the respondent households is represented in Table 4. 11 and Figure 4.12. The age composition is represented by adults (more than 15 years) and children (less than 15 years). The information was collected both for male and female. The male-female ratio of the adult group was found to be 1.29:1.00 whereas the same for the children was estimated at 1.27:1.00. In concurrence to earlier results, adult females outnumber the males in Jharkhand, Kerala and Madhya Pradesh, while for all the remaining states it was vice versa. The overall number of adult males was 1479 as compared to 1282 females. It justifies the common notion of preference of males over females. The percentage of adult females was maximum in Tamil Nadu (74.59 per cent) followed by Kerala (74.01 per cent). The percentage of female children was highest in Assam (56.82 per cent) followed by West Bengal (53.30 per

cent). The adult- child ratio was found to be 1.51 for the total samples (Fig 4.13). It was highest for Tamil Nadu (3.15) followed by Himachal (3.04) and Gujarat (2.81) and lowest for Assam (0.79) followed by West Bengal (0.88) and Madhya Pradesh (0.94). In concurrence to these results, the percentage of adults was maximum for Tamil Nadu at 75.93 per cent followed by Himachal (75.22 per cent)

Table 4.10 Family size of the respondent households (number)

Sl. No.	States	Sam-ple	Family Size						
			<2	2-4	5-6	7-10	>10	Total	Family size
1.	Andhra Pradesh	52	0(0.00)	27(51.92)	20(38.46)	5(9.62)	0(0.00)	52(100.00)	5.06
2.	Assam	100	0(0.00)	43(43.00)	42(42.00)	14(14.00)	1(1.00)	100(100.00)	4.9
3.	Bihar	60	0(0.00)	21(35.00)	21(35.00)	15(25.00)	3(5.00)	60(100.00)	5.87
4.	Gujarat	96	0(0.00)	50(52.08)	42(43.75)	4(4.17)	0(0.00)	96(100.00)	4.45
5.	Himachal	50	0(0.00)	33(66.00)	14(28.00)	3(6.00)	0(0.00)	50(100.00)	4.52
6.	Jharkhand	97	0(0.00)	41(42.27)	44(45.36)	12(12.37)	0(0.00)	97(100.0)	4.67
7.	Kerala	101	1(0.99)	61(60.40)	31(30.69)	8(7.92)	0(0.00)	101(100.00)	4.47
8.	Madhya Pradesh	64	0 (0.00)	21(32.81)	31(48.44)	12(18.75)	0(0.00)	64(100.00)	5.00
9.	Orissa	59	0(0.00)	19(32.20)	32(54.24)	8(13.56)	0(0.00)	59(100.00)	5.07
10.	Tamil Nadu	101	1(0.99)	75(74.26)	24(23.76)	1(0.99)	0(0.00)	101(100.00)	3.74
11.	Uttar Pradesh	100	0 (0.00)	29(29.00)	43(43.00)	23(23.00)	5(5.00)	100(100.00)	4.68
12.	West Bengal	101	0 (0.00)	48(47.52)	42(41.58)	10(9.90)	1(0.99)	101(100.00)	4.77
13.	Total	981	2(0.20)	468(47.71)	386(39.35)	115(11.72)	10(1.02)	981(100.00)	4.68

Figures in parentheses indicate percentage to total of each state

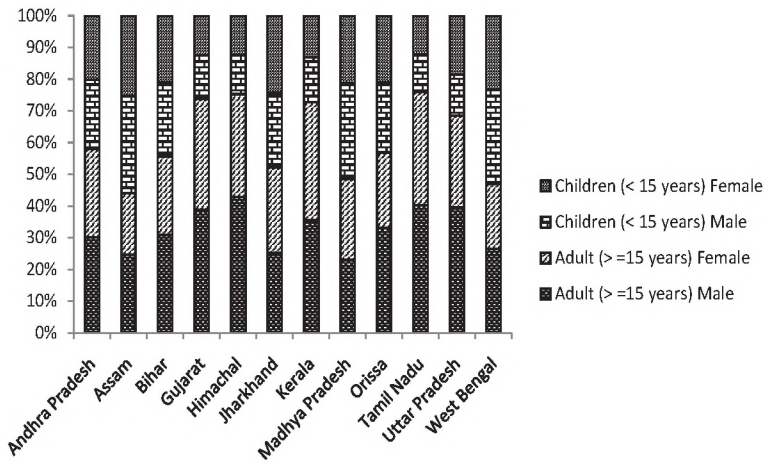


Fig 4.12 Age composition of the respondent households (Number)

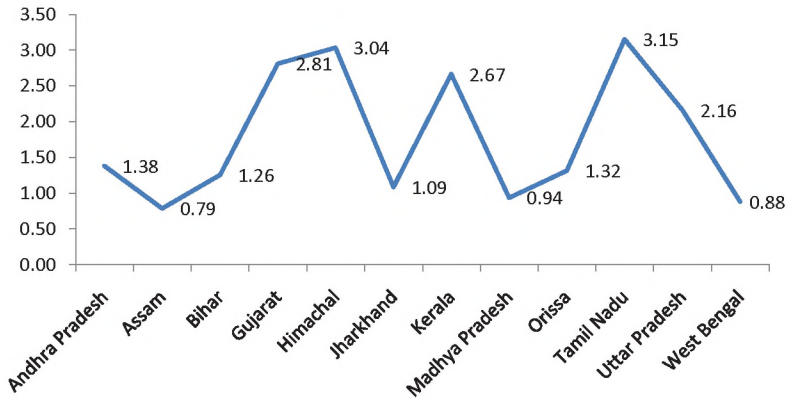


Fig 4.13 Dependency ratio

Table 4.11 Age composition of the respondent households (Number)

Sl. No.	States	Adult (> =15 years)		Children (< 15 years)		Total		Adult-minor ratio
		Male	Female	Male	Female	Adult	Children	
1.	Andhra Pradesh	73(57.94)	68(58.12)	53(42.06)	49(41.88)	141(58.02)	102(41.98)	1.38
2.	Assam	121(44.81)	95(43.18)	149(55.19)	125(56.82)	216(44.08)	274(55.92)	0.79
3.	Bihar	109(57.07)	87(54.04)	82(42.93)	74(45.96)	196(55.68)	156 44.32)	1.26
4.	Gujarat	166(74.11)	149(73.40)	58(25.89)	54(26.60)	315 (73.77)	112 (26.23)	2.81
5.	Himachal	97(77.60)	73(72.28)	28(22.40)	28(27.72)	170(75.22)	56 (24.78)	3.04
6.	Jharkhand	115(52.04)	121(52.16)	106(47.96)	111(47.84)	236 (52.10)	217 (47.90)	1.09
7.	Kerala	160(71.43)	168 (74.01)	64(28.57)	59(25.99)	328 (72.73)	123 (27.27)	2.67
8.	Madhya Pradesh	74(43.27)	81(54.36)	97(56.73)	68(45.64)	155(48.44)	165 (51.56)	0.94
9.	Orissa	99(60.00)	71(52.99)	66(40.00)	63(47.01)	170 (56.86)	129 (43.14)	1.32
10.	Tamil Nadu	152(77.16)	135(74.59)	45(22.84)	46(25.41)	287 (75.93)	91 (24.07)	3.15
11.	Uttar Pradesh	185(75.20)	135(60.81)	61(24.80)	87(39.19)	320 (68.38)	148 (31.62)	2.16
12.	West Bengal	128(47.41)	99(46.70)	144(53.33)	113(53.30)	227 (46.90)	257 (53.10)	0.88
13.	Total	1479(60.86)	1282(59.38)	953(39.22)	877(40.62)	2761(60.14)	1830(39.86)	1.51

Figures in parentheses indicate percentage to total

The male female ratio among the adult and children is indicated in Figure 4.14. Comparatively male female ratio for children was lower than adults indicating better percentage of females in this group. It is contrary to the overall national average for whole country. It can be noticed that the male – female ratios among the adult and children followed a skewed distribution with maximum gap for Orissa and West Bengal at 0.52 and almost same for Andhra and Kerala. The overall male female ratio among adult and children were estimated at 1.27 for children and 1.29 for adults. Nevertheless males are the most preferred child over females in the selected sample repsondent houseolds.

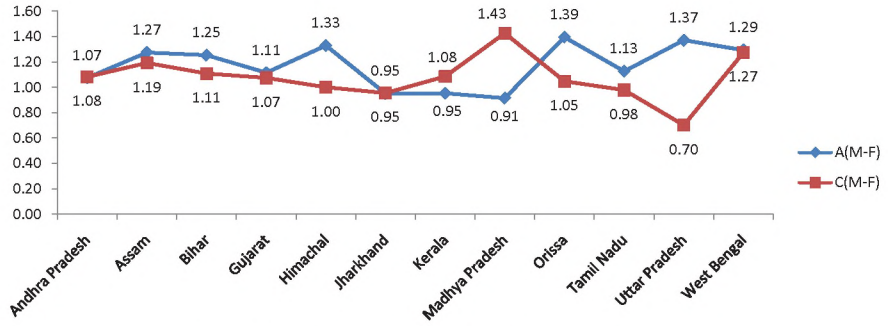


Fig. 4.14 Male female ratio for children and adults

B. Literacy profile

The literacy status of the respondent households was analyzed through the literacy level, educational status – continuing and dropouts and access to educational facilities. The illiterate indicates fisher folk without any formal education and doesn't even possess functional literacy.

(i) Literacy Status

The literacy status includes the level of education as indicated by primary, secondary and collegiate. The primary level indicated schooling till fourth grade, secondary level indicated by high school, secondary and vocational education. The collegiate level of education was denoted by collegiate and professional education.

The general literacy rate of India as a whole was 74.52 per cent (Census-2011) against the literacy rate of 71 per cent among the fisher folk (Table 4.12 & Figure. 4.17 and 4.18). The results indicated that among the literates 30 per cent were primary, 36 per cent were secondary and only 5 per cent reached college level. The analysis of state wise literacy rate revealed highest estimate for Kerala (95 per cent) followed by Tamil Nadu (86 per cent) and West Bengal (78 per cent). The literacy rates were lowest at Madhya Pradesh and Andhra Pradesh (50 per cent) followed by Jharkhand (57 per cent)

The percentage of members literate upto primary level was in the range of 14.71 per cent in Andhra to 51.46 per cent in Orissa. For the literacy upto secondary level highest percentage

Fig. 4.15 Non school going children

was for the states of Kerala (67.67 per cent) followed by Tamil Nadu (60.67 per cent). In this category of literacy level, minimum percentage was for Madhya Pradesh at 8.24 per cent. The persons with collegiate education were maximum in West Bengal (15.35 per cent). For all the other states it was less than 10 per cent with no collegiate in Madhya Pradesh.

Thus it was found that the literacy rate was showing similar tendency in the states of Madhya Pradesh, Andhra Pradesh and Jharkhand, when compared with the general literacy rate of India. It is also important to note that the fishers' literacy rate has improved significantly with 71 per cent obtaining formal education.

Fig. 4.16 Girls on their way to school

High percentage of illiteracy level among respondents in Madhya Pradesh, Andhra Pradesh and Jharkhand indicated that being traditional fisher folk they got limited opportunities in terms of money, facilities, and family support to study. They entered in to this profession at a younger age forcefully and continued this profession due to very weak socio-economic status.

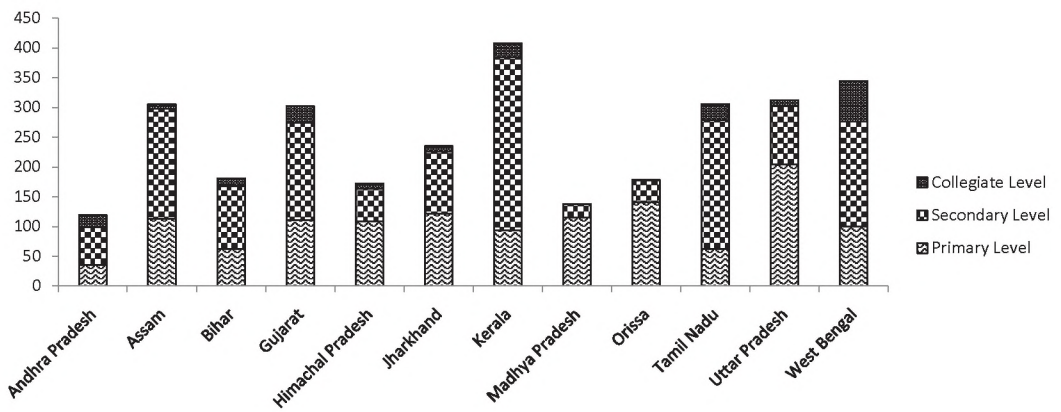


Fig 4.17 Literacy Status of respondent households (Number)

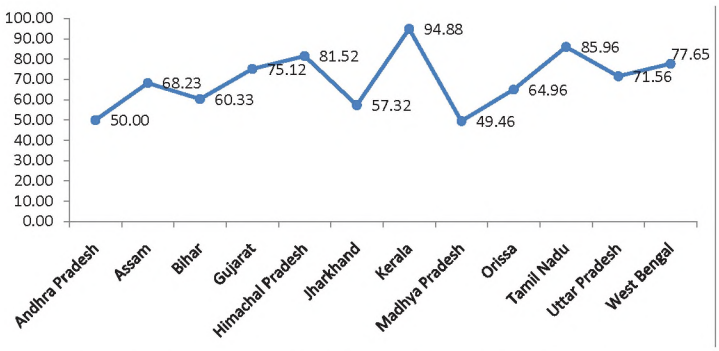


Fig. 4.18 Literacy rate of sampled inland fisher households

Table 4.12 Literacy status of respondent households (Number)

Sl. No.	State	Total	Illiterate	Literate	Primary Level	Secondary Level	Collegiate Level
1.	Andhra Pradesh	238	119(50.00)	119(50.00)	35(14.71)	64(26.89)	20(8.40)
2.	Assam	447	142(31.77)	305(68.23)	113(25.28)	185(41.39)	7(1.57)
3.	Bihar	300	119(39.67)	181(60.33)	62(20.67)	106(35.33)	13(4.33)
4.	Gujarat	402	100(24.88)	302(75.12)	111(27.61)	163(40.55)	28(6.97)
5.	Himachal Pradesh	211	39(18.48)	172 (81.52)	108(51.18)	55 (26.07)	9(4.27)
6.	Jharkhand	410	175(42.68)	235(57.32)	121(29.51)	105(25.61)	9(2.20)
7.	Kerala	430	22(5.12)	408(94.88)	93(21.63)	291(67.67)	24(5.58)
8.	Madhya Pradesh	279	141(50.54)	138(49.46)	115(41.22)	23(8.24)	0(0.00)
9.	Orissa	274	96(35.04)	178(64.96)	141(51.46)	36(13.14)	1(0.36)
10.	Tamil Nadu	356	50(14.04)	306(85.96)	62(17.42)	216(60.67)	28(7.87)
11.	Uttar Pradesh	436	124(28.44)	312(71.56)	204(46.79)	98(22.48)	10(2.29)
12.	West Bengal	443	99(22.35)	344 (77.65)	100(22.57)	176(39.73)	68(15.35)
13.	Total	4226	1226(29.01)	3000(70.99)	1265(29.93)	1518(35.92)	217(5.13)

Figures in parentheses indicate percentage to total of each state

(ii) Educational status

The information on education of the respondents in terms of continuance and discontinuance of education would provide the scope of employment opportunities, possible migration, and alternative avocation of the sample households. Thus continuing and dropout ratios were calculated among the respondent households across the inland waters in the country. The continuing drop out ratio indicates extent of growing importance of education between the past and the present.

The dropouts were more at secondary level of education with 48.20 per cent ranging from 31.75 per cent at Bihar to 67.32 per cent at Tamil Nadu (Table 4.13). The dropout at primary level of education was 39.68 per cent ranging from 26 per cent at Andhra to 61.49 per cent at Uttar Pradesh The dropout at collegiate level was estimated at 9.47 per cent with range of 0.88 per cent at Orissa to 17.44 per cent at Assam.

The overall dropout percentage in total was 61.23 per cent with nearly 70 per cent for Bihar and Kerala and 39 per cent for Andhra.

It was found that the tendency to drop out from education was more with secondary education followed by primary and least with collegiate education. This is on account of generating source of employment in fisheries related activities even with secondary education as there was no other means of education and also due to following the traditional employment available. The drop outs possessing primary education was comparatively lesser as it was mandatory for the kids to study primary level of education. Collegiate education provided a source of alternate employment and another means of livelihood. In the case of Assam and West Bengal higher number of drop outs during college education indicated the higher level of income from fishing/other source of employment. The lower percentage of drop outs at this level for other states was due to the fact that very limited number of fisher family members reached this level, as they were dropped during earlier levels.

The improved facilitates and measures for increasing level of awareness of education among the households also resulted in better literacy, although, they dropped out at primary and secondary levels. It was found that the continuing- dropout ratio (Fig. 4.19) was the highest for Andhra (1.59) followed by Gujarat (1.24). These estimates revealed increased enrolment in school by present generation as compared to past. Further, dropout level also was raised from primary to secondary with better percentage. The continuing to dropout ratio indicates a parameter on increasing education was found to be lowest for the states of Jharkhand (0.38). Alternative source of livelihood, possibility of seeking employment in fisheries enterprises, scope of labour can be the reasons for the increasing dropouts among the fisher families operating in inland waters

Table 4.13 Educational status of respondent households-Continuing and Dropout (Number)

Sl. No.	State	Continuing	Drop outs			
			Primary	Secondary	Collegiate	Total
1.	Andhra Pradesh	73	12(26.09)	28(60.87)	6(13.04)	46(38.66)
2.	Assam	110	57(29.23)	104(53.33)	34(17.44)	195(63.93)
3.	Bihar	55	71(56.35)	40(31.75)	15(11.90)	126(69.61)
4.	Gujarat	167	61(45.19)	56(41.48)	18(13.33)	135(44.70)
5.	Himachal Pradesh	80	44(47.83)	45(48.91)	3(3.26)	92(53.49)
6.	Jharkhand	65	53(31.18)	94(55.29)	23(13.53)	170(72.34)
7.	Kerala	124	79(27.82)	155(54.58)	20(7.04)	284(69.61)
8.	Madhya Pradesh	64	41(55.41)	32(43.24)	1(1.35)	74(53.62)
9.	Orissa	64	70(61.40)	43(37.72)	1(0.88)	114(64.04)
10.	Tamil Nadu	101	56(27.32)	138(67.32)	11(5.37)	205(66.99)
11.	Uttar Pradesh	138	107(61.49)	62 (35.63)	5(2.87)	174(55.77)
12.	West Bengal	122	78(35.14)	107(48.20)	37(16.67)	222(64.53)
13.	Total	1163	729(39.68)	904(48.20)	174(9.47)	1837(61.23)

Figures in parentheses indicate percentage to total of each state

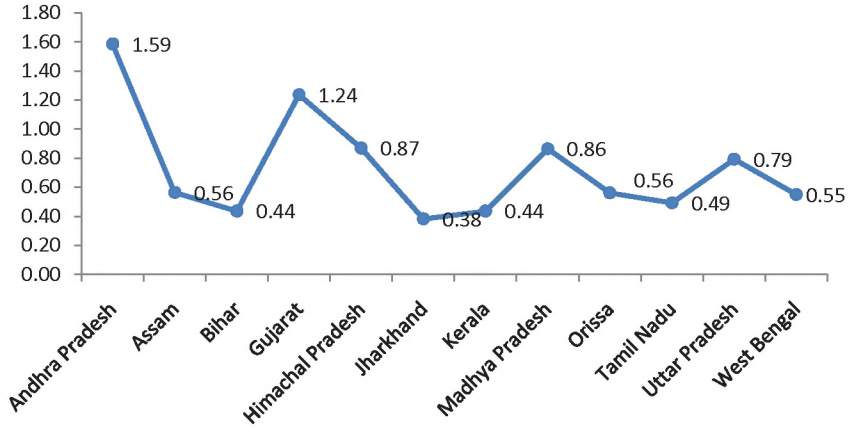


Fig. 4.19: Continuing Dropouts ratio among respondent households

(iii) Access to educational institutions

Access to education is an important yardstick to measure the socio-economic well being of a society. The proximity of the educational institutions like primary school, high school, college, and professional college provides a major impetus when it comes to continuing education. That was something the fisher folk were said to be denied earlier which was disproved by the findings of the study.

Fig. 4.20. Children playing at school

The access to education was analyzed by finding the distance to nearby educational institutions. The average distance from fishing villages to nearly primary, high school, college and professional institution are given in Table 4.14 and Figure 4.21. As a whole the average distance to a primary school is 1.32 km, high school 4.23 km college 11.73 km and professional institution 19.83 km from fishing villages in India. The average distance to primary school ranges from 0.2 km in Orissa to 3.35 km for West Bengal. The distance for high schools ranges from 2.24 km for Andhra to 9.02 km for Uttar Pradesh. The average distance for colleges was between from 1 km in Orissa to 18.70 km in Madhya Pradesh. where as in the case of college, the average distance ranged from 8.00 km for Orissa to 37.8 km for Jharkhand. It is evident

from the results that the improved or increased access to educational facilities has helped to increase the literacy level of the fishers.

4.14 Access to education (km)

Sl. No.	States	Primary School	High School	College	Professional College
1.	Andhra Pradesh	0.86	2.24	4.77	19.56
2.	Assam	0.21	2.71	9.34	13.5
3.	Bihar	1.76	2.50	5.04	9.00
4.	Gujarat	0.43	2.32	8.84	26.70
5.	Himachal Pradesh	0.88	2.26	10.14	10.44
6.	Jharkhand	1.00	3.10	11.70	37.80
7.	Kerala	2.15	3.68	11.80	23.89
8.	Madhya Pradesh	0.90	7.80	18.70	16.80
9.	Orissa	0.20	3.00	1.00	8.00
10.	Tamil Nadu	1.15	3.33	18.21	21.32
11.	Uttar Pradesh	0.88	9.02	16.15	16.48
12.	West Bengal	3.35	5.33	13.81	13.86
13.	Average	1.32	4.23	11.73	19.83

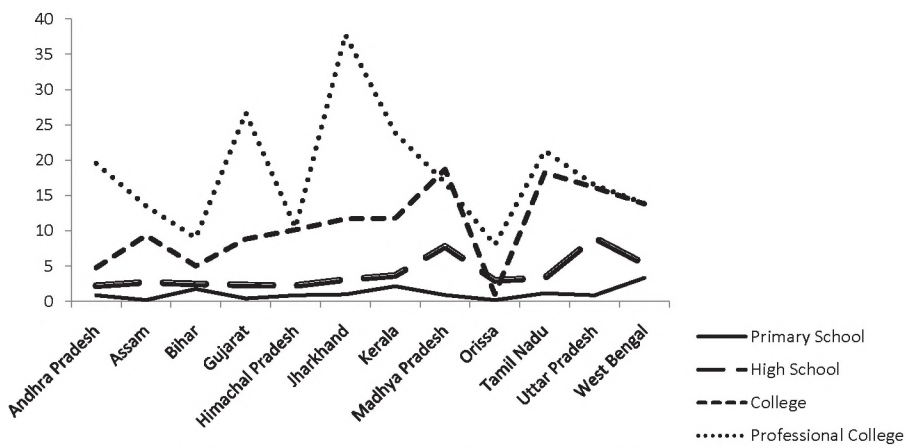


Fig 4.21 Access to educational institutions- Distance in km

(C) Health status

The health status of the respondent households was studied based on the parameters: administration of vaccines, incidence of discontinuation, birth weight of infants, incidence of maternal and child mortality at the time of birth, incidence of common diseases and special ailments among adults and children. Disease management aspects like access to health care, problems in health management and suggestions to improve the health care facilities are also dealt in this session.

(i) Vaccination regime of infants / children (less than 15 years)

The average age of administration of vaccination and incidence of discontinuation among infants/ children with age less than 15 years in selected inland states of India is furnished in Table 4.15. The vaccination for Pox, BCG, MMR and Polio were regularly taken by all the families covered under the study. The average age at which the vaccination for pox was given to the child worked out at 1.05 years ranging from at 0.23 years at Bihar to 3.08 years at Himachal. The average age at which BCG was administered was 0.69 years ranging from 0.28 years at Uttar Pradesh to 1.0 year at Andhra Pradesh, Assam, Gujarat, Jharkhand and Orissa. The average age for administering MMR was 0.96 years which varies from 0.42 years at Bihar to 1.5 years at West Bengal. On an average Polio vaccine was administered till the age of 3.58 years varying from 2.24 at Tamil Nadu to 5 years at Andhra Pradesh and Jharkhand (Figure. 4.22)

(ii) Incidence of discontinuation

Incidence of discontinuation of vaccination for Pox was noticed in Uttar Pradesh among 42.94 per cent of the children. The next highest discontinuation was for MMR and Polio in Himachal Pradesh at 13.33 and 11.11 per cent (Figure 4.23). The results on the vaccination regime of infants/children indicated that the children were getting vaccinations in most of the states as per the recommendation of ICMR.

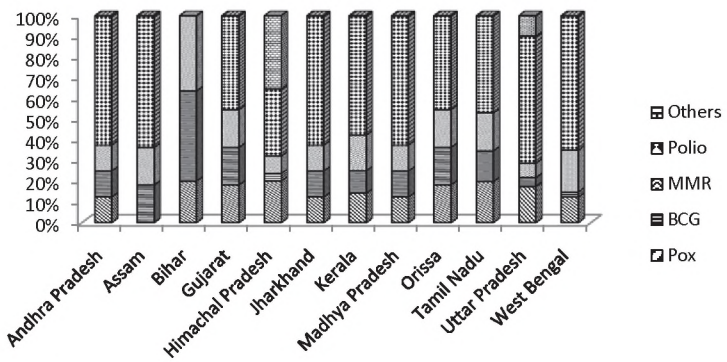


Fig. 4.22 Average age of administration of vaccination

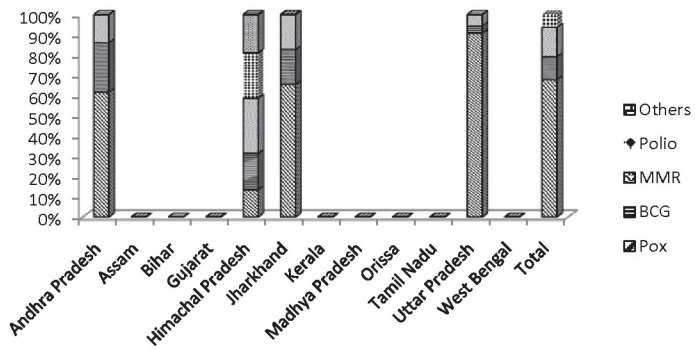


Fig. 4.23 Incidence of discontinuation of vaccination in per cent

Table 4.15 Vaccination regime of infants / children (less than 15 years)
Average age of administration and incidence of discontinuation

Sl. No.	State	Pox		BCG		MMR		Polio		Others	
		Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)
1.	Andhra Pradesh	1.00	5.30	1.00	2.10	1.00	1.20	5.00	0.00		
2.	Assam			1.00	0.00	1.00	0.00	3.50	0.00		
3.	Bihar	0.23	0.00	0.50	0.00	0.42	0.00				
4.	Gujarat	1.00	0.00	1.00	0.00	1.00	0.00	2.50	0.00		
5.	Himachal Pradesh	3.08	6.67	0.54	8.89	1.30	13.33	4.94	11.11	5.43	9.37
6.	Jharkhand	1.00	11.30	1.00	3.00	1.00	3.00	5.00	0.00		
7.	Kerala	0.84	0.00	0.64	0.00	1.02	0.00	3.39	0.00		
8.	Madhya Pradesh	1.00	0.00	1.00	0.00	1.00	0.00	5.00	0.00		
9.	Orissa	1.00	0.00	1.00	0.00	1.00	0.00	2.50	0.00		
10.	Tamil Nadu	0.94	0.00	0.71	0.00	0.86	0.00	2.24	0.00		
11.	Uttar Pradesh	1.14	42.94	0.28	1.64	0.46	2.72	4.00	0.00	0.65	0.00
12.	West Bengal	0.92	0.00	0.17	0.00	1.50	0.00	4.81	0.00		
13.	Average (Total)	1.05	6.81	0.69	1.14	0.96	1.47	3.58	0.63		

(iii) Reasons for discontinuation

The reason for the discontinuation of vaccination regime of infants is given in Table 4.16 and Fig. 4.24. Among the total 221 responses, maximum number of responses were for others or miscellaneous reasons (62.9 per cent) followed by lack of awareness about the availability of vaccines (11.31 per cent), traditional beliefs (9.95 per cent), lack of time to access the vaccination (7.24 per cent), lack of sufficient doses of vaccine at the locality (4.98 per cent), and poor reliability on vaccines provided by government agencies (3.62 per cent). However in sample states maximum cases of discontinuation was in Assam (45.25 per cent) followed by Uttar and Himachal Pradesh.

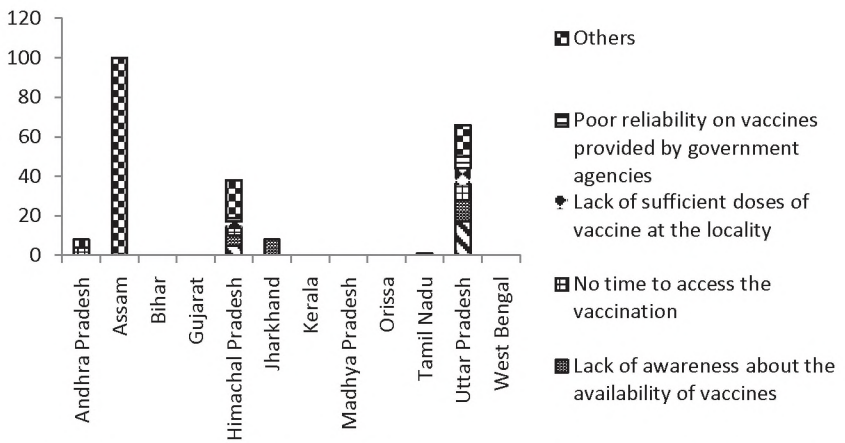


Fig 4.24 Vaccination regime of infants/children - Reason for the discontinuation (Frequency)

Table 4.16 Vaccination regime of infants/children - Reason for the discontinuation (Frequency)

Sl. No.	Reasons	Reason for the discontinuation of vaccination (frequency)													
		Andhra Pradesh	Assam	Bihar	Gujarat	Himachal Pradesh	Jharkhand	Kerala	Madhya Pradesh	Orissa	Tamil Nadu	Uttar Pradesh	West Bengal	Total	per cent
1.	Traditional beliefs	Nil	Nil	Nil	Nil	5	Nil	Nil	Nil	Nil	Nil	17	Nil	22	9.95
2.	Lack of awareness about the availability of vaccines	Nil	Nil	Nil	Nil	5	8	Nil	Nil	Nil	1	11	Nil	25	11.31
3.	No time to access the vaccination	4	Nil	Nil	Nil	4	Nil	Nil	Nil	Nil	Nil	8	Nil	16	7.24
4.	Lack of sufficient doses of vaccine at the locality	Nil	Nil	Nil	Nil	3	Nil	Nil	Nil	Nil	Nil	8	Nil	11	4.98
5.	Poor reliability on vaccines provided by government agencies	Nil	Nil	Nil	Nil	2	Nil	Nil	Nil	Nil	Nil	6	Nil	8	3.62
6.	Others	4	100	Nil	Nil	19	Nil	Nil	Nil	Nil	Nil	16	Nil	139	62.90
7.	Total	8	100	0	0	38	8	0	0	0	1	66	0	221	100.0
		3.62	45.25	0.00	0.00	17.19	3.62	0.00	0.00	0.00	0.45	29.86	0.00	100.0	

Figures in parentheses indicate percentage to total of each state

(iv) Birth weight of infants

The birth weight of infants in fisher households at selected states is given in Table 4.17. The average birth weight of males was 2.6 kg and female was 2.57 kg. The average weight of male infants ranges from 2.00 kg at Orissa to 2.85 kg at Assam and Tamil Nadu. For female infants it ranged from 1.90 kg at Orissa to 2.85 kg at Gujarat. This is in conformity with the average birth weight of a male and female child in India (Census-2001). The graphical representation of the birth weight of the male and female infants across the coastal states is presented in Figure 4.25.

It was found that except in Gujarat, Kerala, Uttar Pradesh and West Bengal the average weight of the female child was less than that of the male child. The average weight of the children in Orissa was the lowest with 2.00 kg and maximum at 2.84 kg at Kerala.

Table 4.17 Birth weight of infants (kg)

Sl. No.	State	Weight (kg)		
		Male	Female	Total
1.	Andhra Pradesh	2.82	2.69	2.77
2.	Assam	2.85	2.60	2.72
3.	Bihar	2.55	2.22	2.36
4.	Gujarat	2.69	2.85	2.77
5.	Himachal Pradesh	2.84	2.75	2.81
6.	Jharkhand	2.60	2.40	2.50
7.	Kerala	2.83	2.88	2.84
8.	Madhya Pradesh	2.10	2.00	2.10
9.	Orissa	2.00	1.90	2.00
10.	Tamil Nadu	2.85	2.71	2.78
11.	Uttar Pradesh	2.39	2.58	2.59
12.	West Bengal	2.69	2.81	2.74
13.	Average (Total)	2.60	2.57	2.59

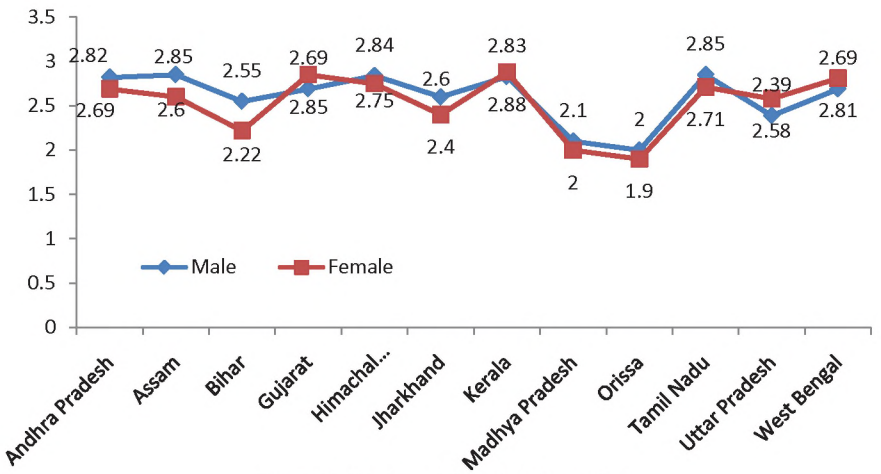


Fig. 4.25 Birth weight of infants (kg)

(v)Incidence of mortality among mother/child during birth

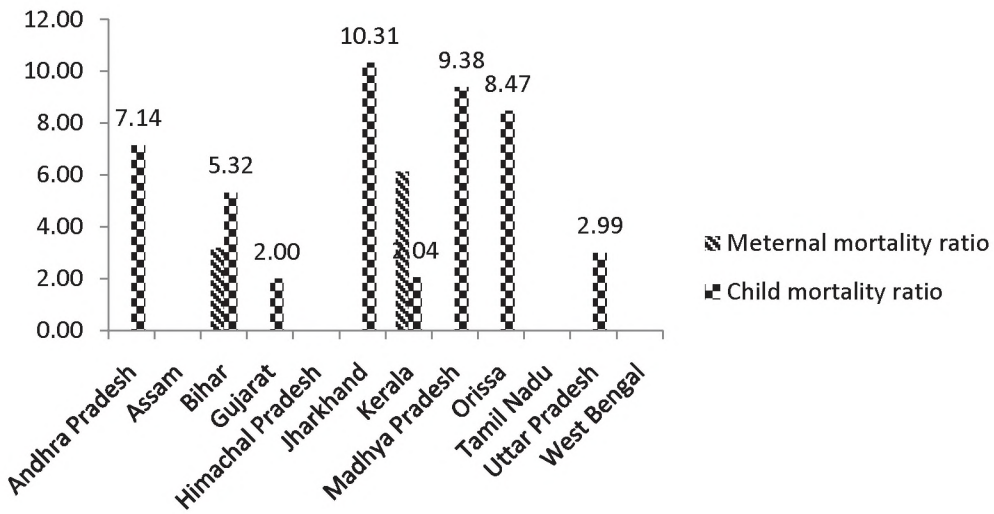
The results on the incidence of mortality among mother/child during birth are furnished in Table 4.18. Maternal and child mortality at the time of birth and infant mortality had been pressing concerns over the past. Generally in India, adequate care is being taken now to reduce the incidence of maternal and infant mortality which was recognized by a central report. The results on the incidence of maternal mortality were 0.70 per cent and that of infant mortality was 4.3 per cent. The overall mortality was estimated at 5 per cent with maximum at Jharkhand (10.31 per cent).There was not even a single case of mortality reported in Assam, Himachal Tamil Nadu and West Bengal. Out of the 860 delivery cases reported across the study period it was found that there were 6 cases of maternal death and 37 cases of infant death. The maternal

Table 4.18: Incidence of mortality among mother/ child during birth (Number)

Sl. No.	State	No of delivery	Mortality of mother/ child during birth				
			Mother	Reason	Child	Reason	Total
1.	Andhra Pradesh	56	0	0	4	0	4 (7.14)
2.	Assam	48	0	0	0	0	0
3.	Bihar	94	3	0	5	0	8 (8.51)
4.	Gujarat	32	0	0	2	0	2 (6.25)
5.	Himachal Pradesh	45	0	0	0	0	0
6.	Jharkhand	97	0	0	10	0	10 (10.31)
7.	Kerala	49	3	0	1	0	4 (8.16)
8.	Madhya Pradesh	64	0	0	6	0	6 (9.38)
9.	Orissa	59	0	0	5	0	5 (8.47)
10.	Tamil Nadu	71	0	0	0	0	0
11.	Uttar Pradesh	134	0	0	4	0	4 (2.99)
12.	West Bengal	111	0	0	0	0	0
13.	Total	860	6 (0.70)	0	37 (4.30)	0	43 (5.00)

Figures in parentheses indicate percentage to total no. of delivery in each state)

mortality was reported in the states of Bihar (3) and Kerala (3). The infant mortality was reported mostly in Jharkhand (10) followed by Madhya Pradesh (6) and Orissa and Bihar at 5. There were cases of infant mortality reported in Andhra Pradesh, Bihar, Gujarat, Jharkhand, Kerala, Madhya Pradesh Orissa and Uttar Pradesh. Accordingly the maternal mortality ratio for Bihar and Kerala was 3.19 and 2.04 (Fig. 4.26), while the child mortality ratio was highest for Jharkhand at 10.31 followed by Madhya Pradesh at 9.38. The major reasons cited for the maternal death was due to malnutrition, complication during delivery and reason for the infant mortality was due to the complication during delivery.



Fig, 4.26 Maternal and Infant Mortality Ratios

(vi)Incidence of diseases among adults

The incidence, frequency, and previous occurrence of diseases among the adult family members of the respondents across the coastal states are discussed in the Table 4.19A and 4.19 B.

Major diseases found among the respondents were categorized under two groups, viz; common diseases and special ailments. Fever/flu, body ache, diarrhoea, gastro enteric disease, skin disorder and reproductive disorder is included in common diseases. Special ailments include diseases like cardiac failure, tuberculosis, anaemia, diabetics, blood pressure, AIDS and others. For males and females average annual frequency was estimated at 1.62 and 1.31 for fever/flu; 1.37 and 0.87 for body ache; 0.34 and 0.33 for diarrhoea; 0.67 and 0.44 for gastro enteric diseases; 0.42 and 0.21 for skin diseases, respectively. The most frequent disease was fever/flu. Regarding special ailments the average frequencies were much lower than common diseases. The most frequent special ailment was not specified by the respondents (0.8 for males and 0.25 for females).In addition, special ailments like anaemia (0.14 for males and 0.63 for femailes),cardiac failure (0.14 for male and 0.07 for female) and TB (0.13 for male and 0.01 for female) were reported among the adult family members of the respondents.

Among the family members 776 males and 705 females were affected with fever, and 378 males and 272 females were having body ache. For most of the diseases the frequency of incidence was more for males than females. The incidence of disease varies across the states according to climatic and other conditions, but most prevalent were fever and body ache.

Table 4.19 A Incidence of diseases among adult (male and female) - Annual frequency

Sr. No.	Disease	Assam		Bihar		Gujarat		Himachal Pradesh		Jharkhand		Kerala	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Common diseases												
1.	Fever/Flue	1.43 (93)	0.97 (79)	0.45 (16)	0.67 (20)	1.28 (93)	1.04 (90)	2.05 (47)	0.14 (2)	1.38 (67)	1.39 (75)	1.96 (80)	1.18 (67)
2.	Body aches	0.41 (34)	0.27 (25)	0.28 (12)	0.47 (15)	0.43 (41)	0.33 (24)	1.02 (34)	0.39 (6)	0.57 (25)	0.17 (9)	1.16 (61)	0.70 (53)
3.	Diarrhoea	0.41 (34)	0.33 (27)	0.05 (3)	0.05 (2)	0.14 (14)	0.15 (15)	0.20 (14)	0.29 (6)	0.01 (1)	0.08 (5)	0.11 (11)	0.05 (6)
4.	Gastro-enteric diseases	0.75 (58)	0.44 31)	0.18 (3)	0.05 (2)	0.05 (5)	0.14 (13)	0.52 (14)	0.25 (8)	0.61 (28)	0.53 (27)	0.63 (25)	0.26 (13)
5.	Skin disorders	0.07 (6)	0.04 (3)	-	0.03 (2)	-	0.01 (1)	0.29 (14)	0.19 (4)	-	0.11 (6)	0.50 (12)	0.14 (5)
6.	Reproductive disorders	-	-	-	-	0.01 (1)	-	-	-	-	-	-	-

	Special Ailments												
7.	Cardiac failure	-	-	0.0 (1)	0.03 (2)			0.02 (1)	0.02 (1)	0.06 (6)	0.0 (2)	0.02 (3)	
8.	TB	0.01 (1)		0.05 (2)	0.03 (1)	0.01 (1)	0.01 (1)	0.02 (1)		0.01 (1)	0.05 (5)		0.01 (1)
9.	Anaemia	-	0.21 (20)			-	0.01 (1)			0.05 (3)	0.13 (8)	0.01 (2)	0.001 (1)
10.	Diabetes	-				-		0.02 (1)					
11.	Blood pressures	-				-		0.06 (3)					
12.	AIDS	-				-							
13.	Others	0.12 (7)	0.02 (2)	0.20 (11)	0.05 (2)	-			0.02 (1)	0.20 (11)	0.05 (3)	0.16 (6)	0.20 (4)

Contd. in 4. 14 B.
Figures in parentheses indicate percentage to total

Table 4.19 B : Incidence of diseases among adult (male and female) - Annual frequency

Sl. No.	Disease	MP		Orissa		TN		UP		WB		India	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Common diseases												
1.	Fever/Flue	1.70 (64)	1.48 (63)	1.70 (57)	1.60 (49)	2.76 (82)	1.58 (72)	1.71 (70)	1.91 (79)	1.20 (107)	1.76 (109)	1.62 (776)	1.31 (705)
2.	Body aches	0.25 (9)	0.06 (2)	2.40 (9)	1.90 (11)	3.57 (69)	0.52 (25)	3.78 (59)	2.39 (45)	0.54 (25)	2.04 (57)	1.37 (378)	0.87 (272)
3.	Diarrhoea	0.03 (2)	0.05 (2)	1.50 (8)	1.50 (2)	0.05 (6)	0.01 (1)	1.34 (35)	1.29 (29)	0.03 (1)	0.05 (4)	0.34 (129)	0.33 (99)
4.	Gastro-enteric diseases	0.08 (4)	0.08 (3)	1.40 (18)	1.70 (15)	0.14 (4)	0.20 (14)	1.53 (32)	0.97 (8)	1.29 (51)	0.37 (13)	0.67 (242)	0.44 (147)
5.	Skin disorders	0.02 (1)	0.05 (3)			0.14 (13)	0.05 (4)	0.88 (13)	1.06 (36)	2.14 (18)	0.36 (13)	0.42 (77)	0.21 (77)
6.	Reproductive disorders										0.24 (2)	0.00 (1)	0.03 (2)
	Special Ailments												
7.	Cardiac failure	0.06 (4)		1.00 (4)	1.00 (4)	0.01 (2)		0.51 (2)		0.03 (3)	0.01 (1)	0.14 (26)	0.07 (10)
8.	TB	0.08 (5)	0.02 (1)	1.00 (1)				0.50 (1)	0.01 (1)	0.02 (2)		0.13 (15)	0.01 (10)
9.	Anaemia	0.05 (3)	0.05 (2)	2.00 (1)	1.00 (1)						4.81 (41)	0.14 (9)	0.63 (74)
10.	Diabetes											0.001 (1)	-

11.	Blood pressures									0.003 (3)	-
12.	AIDS									-	-
13.	Others	0.16 (6)	0.08 (3)	1.70 (3)	1.90 (7)	0.01 (1)	0.51 (2)	5.69 (33)	0.37 (4)	0.80 (98)	0.25 (28)

Figures in parentheses indicate percentage to total

(vii) Incidence of diseases among adult (male and female) previous occurrence

The previous occurrence of diseases among adults (male and female) based on the number of months is discussed in Tables 4.20 A and 4.20 B

In continuation with the above table, the major diseases found within the study area under the title of common diseases were fever/flu, body ache, diahorrea, gastro enteric disease, skin disorder, reproductive disorder etc The most common diseases prevalent among the respondent families were fever and body ache

On an average most recent occurrence of fever/flu was found among male members of the respondent families was in 2.81 months and it was in 3.45 months among female members.

In the case of body ache the previous occurrence was found in 2.63 months in males and 3.10 months in females. Occurrence of diarrhoea and skin disorder was seen among male members with a previous occurrence of 4.73 and 7.08 months ago and for females at 7.89 and 4.44 months ago, respectively.

The most common special ailments found among the respondents were cardiac failure, TB and anaemia, etc. Previous occurrence of cardiac failure among the male and female members was found 19.84 and 37.39 months ago, whereas incidence of anaemia was 4.01 and 4.78 month for male and female respondents.

(viii) Incidence of diseases among children (Male and Female) - Annual frequency

The annual frequency on the incidence of diseases among children (Male and Female) is furnished in Table 4.21A and 4.21 B

The important common diseases found among children were fever, diarrhoea, body ache, and skin disorder. Major diseases found among the children in the study area were fever/flu (379 cases for male and 305 for females), diahorrea (122 male and 100 female), body ache (76 male and 71 females), gastro enteric disease (23 both for male and female), skin disorder (35 male and 32 females), etc. As mentioned above fever was the most popular disease found among the children and it was distributed across all the states. The average frequency of fever among male children was 0.89 times per year for male children and 0.76 times for female child. In the case diahorrea the frequencies were 0.46 and 0.44 for male and female children. In case of body ache it was 0.28 and 0.25 respectively. The skin disorder and gastro enteric diseases occurred at frequency of 0.18 for male and female child, barring skin disorder for female child at 0.11.

Table 4.20 A Incidence of diseases among adult (male and female) previous occurence (Numbers of months)

Sl. No.	Disease	Assam		Bihar		Gujarat		Himachal Pradesh		Jharkhand		Kerala	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Common diseases												
1.	Fever/Flue	0.50 (2)		4.31 (16)	3.54 (20)	2.87 (93)	2.83 (88)	3.22 (47)	2.64 (2)	2.60 (67)	3.50 (75)	1.63 (80)	1.57 (67)
2.	Body aches	0.50 (1)	0.50 (1)	3.40 (12)	3.34 (14)	2.34 (40)	2.47 (22)	2.48 (34)	2.11 (6)	2.80 (25)	2.30 (9)	1.43 (61)	1.62 (53)
3.	Diarrhoea	-	-	4.20 (2)	5.40 (2)	2.25 (14)	2.16 (16)	0.76 (14)	0.36 (6)	7.00 (1)	3.80 (5)	1.19 (11)	1.00 (6)
4.	Gastro-enteric diseases	0.50 (2)	-	4.00 (3)	4.50 (2)	2.95 (5)	3.07 (13)	0.83 (14)	0.52 (8)	3.00 (28)	3.60 (27)	1.34 (25)	1.14 (13)
5.	Skin disorders	0.50 (1)	0.50 (1)	-	3.90 (2)	-	-	1.58 (14)	0.47 (4)	3.50 (13)	4.00 (6)	1.42 (12)	1.65 (5)
6.	Reproductive disorders	-	-	-		1.00 (1)	-	-	-		-	-	-
	Special Ailments												
7.	Cardiac failure	-	-	6.00 (1)	3.60 (2)	-	-	30.00 (1)	26.00 (1)	4.20 (6)	2.00 (2)	2.83 (3)	-
8.	TB	0.50 (1)	-	3.60 (2)	1.80 (1)	-	-	96.00 (1)	-	4.00 (1)	3.00 (5)	-	0.25 (1)
9.	Anaemia	-	-	-	-	-	-	-	-	4.70 (3)	4.80 (8)	0.50 (1)	0.75 (2)
10.	Diabetes	-	-	-	-	-	-	72.00 (1)	-	-	-	-	-
11.	Blood pressures	-	-	-	-	-	-	48.00 (3)	-	-	-	-	-
12.	AIDS	-	-	-	-	-	-	-	-	-	-	-	-
13.	Others	-	-	3.38 (11)	3.00 (2)	1.93 (1)	-	-	48.00 (1)	48.00 (1)	2.00 (1)	0.50 (2)	0.25 (1)

Contd. in Table 4.15 B..
Figures in parentheses indicate percentage to total

Table 4.20B : Incidence of diseases among adult (Male and Female) Previous occurrence (Number of months)

Sl. No.	Disease	MP		Orissa		TN		UP		WB		India	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Common diseases												
1.	Fever/Flue	3.60 (64)	4.80 (63)	3.00 (57)	4.58 (49)	2.305 (81)	3.11 (72)	3.15 (86)	4.02 (79)	3.00 (101)	3.58 (101)	2.81 (694)	3.45 (616)
2.	Body aches	3.70 (9)	2.50 (2)	15.08 (9)	15.02 (11)	1.31 (69)	1.44 (25)	3.43 (43)	4.11 (48)	3.16 (25)	2.51 (56)	2.63 (328)	3.10 (247)
3.	Diarrhoea	5.00 (2)	4.50 (2)	25.81 (8)	162.25 (2)	2.33 (6)	6.00 (1)	4.13 (35)	5.25 (30)	2.67 (3)	3.53 (4)	4.73 (96)	7.89 (74)
4.	Gastro-enteric diseases	3.80 (4)	4.30 (3)	12.13 (18)	11.80 (15)	2.63 (4)	4.43 (14)	7.44 (32)	21.50 (8)	3.31 (51)	2.38 (13)	4.35 (186)	5.34 (116)
5.	Skin disorders	4.00 (1)	5.70 (3)	-	-	5.85 (13)	0.20 (4)	24.01 (14)	6.09 (37)	2.61 (7)	1.01 (3)	7.08 (72)	4.44 (65)
6.	Reproductive disorders	-	-	-	-	-	-	-	-	-	1.00 (2)	1.00 (1)	1.00 (2)
	Special Ailments												
7.	Cardiac failure	6.30 (4)	-	70.80 (4)	78.18 (4)	-	-	30.00 (1)	-	16.08 (3)	24.00 (1)	19.84 (23)	37.39 (10)
8.	TB	6.40 (5)	8.00 (1)	53.00 (1)	-	0.50 (1)	-	180 (1)	60.00 (1)	9.12 (2)	-	16.00 (15)	9.45 (9)
9.	Anaemia	4.30 (3)	3.50 (2)	29.50 (1)	23.60 (1)	-	-	-	-	-	0.77 (55)	4.01 (8)	4.78 (68)
10.	Diabetes	-	-	-	-	-	-	-	-	-	-	72.00 (1)	-
11.	Blood pressures	-	-	-	-	-	-	-	-	-	-	48.00 (3)	-
12.	AIDS	-	-	-	-	-	-	-	-	-	-	-	-
13.	Others	3.70 (6)	3.70 (3)	45.23 (3)	30.34 (7)	-	-	120.00 (1)	154 (2)	1.38 (53)	4.67 (3)	5.63 (78)	16.18 (20)

Figures in parentheses indicate percentage to total

Table 4.21 A: Incidence of diseases among children (Male and Female) - Annual frequency

Sl. No.	Disease	Assam		Bihar		Gujarat		Himachal Pradesh		Jharkhand		Kerala	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Common diseases												
1.	Fever/Flue	0.42 (36)	0.25 (20)	0.27 (14)	0.18 (9)	0.51 (45)	0.40 (35)	0.67 (12)	0.54 (17)	0.64 (27)	0.64 (26	0.73 (36)	0.66 (36)
2.	Body aches	0.15 (11)	0.21 (19)	0.05 (3)		0.07 (7)	0.04 (4)	0.54 (9)	0.39 (9)	-	0.02 (1)	0.19 (13)	0.08 (9)
3.	Diarrhoea	0.10 (10)	0.06 (5)	0.08 (3)	0.05 (3)	0.33 (25)	0.23 (18)	0.55 (11)	0.21 (7)	0.08 (4)	0.15 (6)	0.35 (23)	0.26 (16)
4.	Gastro-enteric diseases	-	-	0.07 (1)	-	0.07 (7)	0.08 (8)	0.20 (5)	0.13 (4)	0.01 (1)	-	0.03 (4)	0.01 (1)
5.	Skin disorders	-	-	-	-	-	-	0.30 (13)	0.66 (12)	0.02 (2)	0.02 (1)	-	-
6.	Reproductive disorders	-	-	-	-	-	-	-	-	-	-	-	-
	Special Ailments												
7.	Cardiac failure	-	-	-	-	-	-	-	-	-	-	-	-
8.	TB	-	-	-	0.02 (1)	-	0.01 (1)	-	-	-	-	0.01 (1)	0.02 (2)
9.	Anaemia	-	-	-	0.02 (1)	-	-	-	-	-	0.01 (1)	0.02 (3)	0.03 (4)
10.	Diabetes	-	-	-	-	-	-	-	-	-	-	-	-
11.	Blood pressures	-	-	-	-	-	-	-	-	-	-	-	-
12.	AIDS	-	-	-	-	-	-	-	-	-	-	-	-
13.	Others	-	-	0.03 (2)	0.02 (1)	-	0.01 (1)	-	-	-	0.01 (1)	0.02 (2)	0.03 (3)

Contd. in Table 4.16 B..

Figures in parentheses indicate percentage to total

Table 4.21 B: Incidence of diseases among children (Male and Female) - Annual frequency

Sl. No.	Disease	MP		Orissa		TN		UP		WB		India	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Common diseases												
1.	Fever/Flue	1.18 (47)	0.70 (28)	2.10 (29)	1.80 (28)	0.99 (34)	1.00 (33)	1.90 (43)	1.81 (41)	0.63 (56)	0.39 (32)	0.89 (379)	0.76 (305)
2.	Body aches	0.08 (4)	0.03 (1)	-	-	-	0.50 (2)	1.82 (29)	1.28 (25)	-	0.02 (1)	0.28 (76)	0.25 (71)
3.	Diarrhoea	0.12 (7)	0.02 (1)	1.70 (3)	2.00 (3)	0.50 (1)	0.51 (3)	1.51 (33)	1.47 (32)	0.02 (2)	0.06 (6)	0.46 (122)	0.44 (100)
4.	Gastro-enteric diseases	-	-	-	-	-	-	1.38 (5)	1.59 (10)	-	-	0.18 (23)	0.19 (23)
5.	Skin disorders	-	-	1.00 (1)				0.94 (19)	0.71 (19)	-	-	0.18 (35)	0.11 (32)
6.	Reproductive disorders	-	-	-	-	-	-	-	-	-	-	-	-
	Special Ailments												
7.	Cardiac failure	-	-	-	-	0.03 (2)	-	-	-	-	-	0.004 (2)	
8.	TB	-	-	-	-	-	-	-	-	-	-	0.001 (1)	0.004 (4)
9.	Anaemia	-	-	-	-	-	-	-	-	-	-	0.003 (3)	0.01 (6)
10.	Diabetes	-	-	-	-	-	-	-	-	-	-	-	-
11.	Blood pressures	-	-	-	-	-	-	-	-	-	-	-	-
12.	AIDS	-	-	-	-	-	-	-	-	-	-	-	-
13.	Others	0.05 (2)	0.03 (1)	1.50 (2)	1.80 (4)	-	-	-	-	0.17 (4)	-	0.12 (12)	0.12 (11)

Contd. in Table 4.16 B..
Figures in parentheses indicate percentage to total

(ix) Incidence of diseases among children - Previous occurrence

The previous occurrence of diseases among children based on the number of months is discussed in Table 4.22 A and 4.22 B.

In continuation with the above table, the major common diseases found within the study area were fever/flu, body ache, diahorrea, gastro enteric disease, skin disorder, etc The most common diseases prevalent among the children of the respondent families were fever and diahorrea. On an average most recent occurrence of fever/flu was found among male children of the respondent families was 3.13 months ago and it was 3.34 months among female

children. In the case of body ache the previous occurrence was found in 3.48 months in males and 4.51 months ago in females. Occurrence of diahorrea and skin disorder was seen with a previous occurrence of 4.43 and 15.58 months among male and 3.83 and 6.83 months for female child, respectively.

The special ailments were also rarely reported among children like cardiac failure (2), TB (6), and anaemia (8).

Table 4.22 A: Incidence of diseases among children (Male and Female) – Previous occurrence

Sl. No.	Disease	Assam		Bihar		Gujarat		Himachal Pradesh		Jharkhand		Kerala	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Common diseases												
1	Fever/Flue	1.00 (1)	1.00 (1)	3.42 (14)	4.13 (9)	2.50 (44)	3.14 (35)	2.17 (12)	0.88 (17)	2.40 (27)	2.90 (26)	1.46 (36)	1.62 (36)
2	Body aches	-	-	2.60 (3)	1.20 (1)	1.72 (7)	2.04 (4)	1.38 (9)	1.12 (9)	-	1 (1)	1.86 (7)	1.17 (10)
3	Diarrhoea	-	-	1.60 (3)	5.00 (3)	2.50 (24)	3.01 (17)	1.34 (11)	2.52 (7)	2.50 (4)	2.3 (6)	1.34 (23)	1.22 (17)
4	Gastro-enteric diseases	-	-	4.80 (1)	-	3.20 (7)	2.12 (8)	2.51 (5)	0.41 (4)	1.00 (1)	-	0.87 (4)	0.50 (1)
5	Skin disorders	-	-	-	-	-	-	1.59 (13)	1.14 (12)	7.20 (2)	2.00 (1)	-	-
6	Reproductive disorders	-	-	-	-	-	-	-	-	-	-	-	-
	Special Ailments												
7	Cardiac failure	-	-	-	-	-	-	-	-	-	-	-	-
8	TB	-	1.00 (1)	-	1.80 (1)	-	3.00 (1)	-	-	-	-	1.00 (1)	1.00 (2)
9	Anaemia	-	-	-	4.20 (1)	-	-	-	-	-	-	2.50 (3)	0.63 (4)
10	Diabetes	-	-	-		-	-	-	-	-	-	-	-
11	Blood pressures	-	-	-		-	-	-	-	-	-	-	-
12	AIDS	-	-	-		-	-	-	-	-	-	-	-
13	Others	-	-	5.10 (2)	4.80 (1)	-	1.00 (5)	-	-	-	5.00 (1)	3.50 (2)	3.50 (2)

Contd. in Table 4.17 B.
Figures in parentheses indicate percentage to total

Table 4.22 B: Incidence of diseases among children (male and female) – Frequency of occurrence

Sl. No.	Disease	MP		Orissa		TN		UP		WB		India	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Common diseases												
1	Fever/Flue	4.4 (47)	4.90 (28)	6.91 (29)	6.95 (28)	2.19 (34)	2.62 (33)	3.14 (43)	3.25 (41)	2.72 (54)	3.34 (32)	3.13 (341)	3.34 (286)
2	Body aches	3.80 (4)	3.00 (1)	-	-	-	0.50 (2)	6.06 (17)	4.05 (19)	-	3.06 (1)	3.48 (47)	4.51 (47)
3	Diarrhoea	4.30 (7)	4.00 (1)	7.77 (3)	33.43 (3)	0.50 (1)	0.67 (3)	3.47 (34)	3.88 (33)	4.56 (2)	2.81 (8)	4.43 (112)	3.83 (98)
4	Gastro-enteric diseases	-	-	-	-	-	-	22.20 (5)	11.34 (10)	-	-	6.75 (23)	5.76 (23)
5	Skin disorders	-	-	4.00 (1)	-	-	-	14.29 (17)	10.89 (18)			15.58 (33)	6.83 (31)
6	Reproductive disorders	-	-	-	-	-	-	-	-	-	-	-	-
	Special Ailments												
7	Cardiac failure	-	-	-	-	6.25 (2)	-	-	-	-	-	6.25 (2)	-
8	TB	-	-	-	-	-	-	-	-	-	-	1.00 (1)	1.56 (5)
9	Anaemia	-	-		-	-	-	-	-	-	-	2.50 (3)	1.34 (5)
10	Diabetes	-	-	-	-	-	-	-	-	-	-	-	-
11	Blood pressures	-	-	-	-	-	-	--	-	-	-	-	-
12	AIDS	-	-	-	-	-	-	-	-	-	-	-	-
13	Others	3.20 (2)	2.00 (1)	59.00 (2)	41.00 (4)	-	-	-	-	4.01 (4)	-	13.14 (12)	10.79 (14)

Figures in parentheses indicate percentage to total

(x)Access to health care

The access to health care is also an important parameter which determines the continued health of the fisher folk. Often the distance leads to the non treatment or its delay. The access to health care was measured using the distance required to avail the same (Table 4.23). The results indicated that there existed considerable access to the primary health centre and hospital. On an average the primary health centre was available at a distance of 2.31 km and the hospital at 11.1 km. The average distance for the primary health centre ranged from 0.56 km in Tamil Nadu to 5.33 km in Himachal Fig. 4.27.

Table 4.23: Access to health care (distance in km)

Sl. No.	State	Access to health care (km)	
		Primary health centre	Hospital
1.	Andhra Pradesh	1.00	4.80
2.	Assam	3.80	9.66
3.	Bihar	2.50	5.50
4.	Gujarat	0.79	8.61
5.	Himachal Pradesh	5.33	11.36
6.	Jharkhand	3.40	6.50
7.	Kerala	1.77	8.44
8.	Madhya Pradesh	5.20	14.20
9.	Orissa	0.80	11.90
10.	Tamil Nadu	0.56	8.97
11.	Uttar Pradesh	3.02	23.96
12.	West Bengal	0.91	15.43
13.	Average (Total)	2.31	11.10

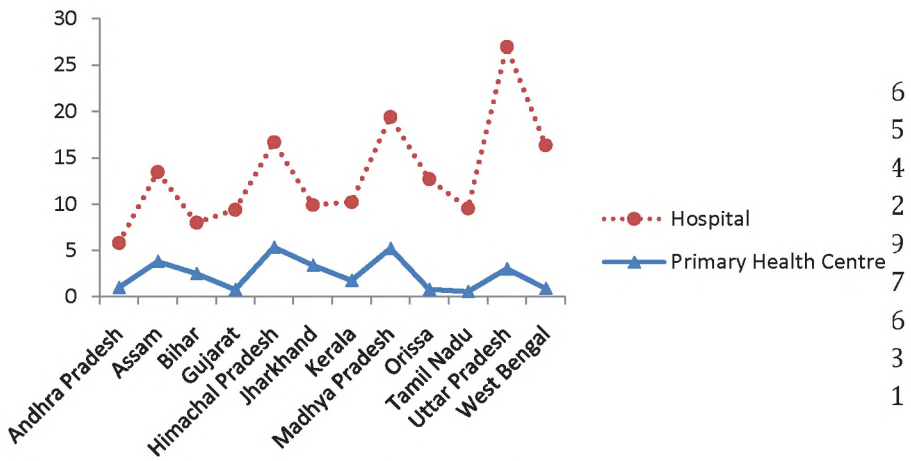


Fig 4.27 : Access to health care (distance in km)

(xi) Problems in health management

The major problems underwent in health management was analyzed based on the opinion of the sample respondents. The major problems cited by the respondents are indicated in Table 4.24. The major problems reported include problems on cleanliness/ sanitation (20.75 per cent), unspecified problems (17.29 per cent), drinking water problem (12.05 per cent), lack of adequate effective medicines (11.56 per cent), non availability of specialist and paramedicines in health centers (10.16 per cent), poor infrastructure (9.68 per cent), difficulty in accessing the hospital due to distance (9.43 per cent) and work related stress (3.24 per cent).

Fig4. 28 Glimpse of Government Hospital at Digha

Fig. 4. 29 Children waiting for their turn for mid day meal

Fig 4.30 Public water supply for drinking water

Table 4.24 Problems in health management (Frequency)

Sl. No.	Problems	A.P	Assam	Bihar	Gujarat	H.P.	JH	Kerala	M.P	Orissa	T.N.	U.P.	W.B.	Total
1.	Difficulty in accessing the hospital due to distance	0 (0.00)	0	0	0	35 (17.86)	0	24 (16.11)	0	0	0	78 22.29	18 5.68	155 (9.43)
2.	Non availability of specialist and paramedicines in health centers	10 (29.41)	20 (50.00)	0	0	33 (16.84)	0	1 (0.67)	0	0	1 (0.61)	57 16.29	45 14.20	167 (10.16)
3.	Poor infrastructure	6 (17.65)	0	4 (4.40)	0	31 (15.82)	23 (23.71)	9 (6.04)	0	0	8 (4.91)	32 9.14	46 14.51	159 (9.68)
4.	Lack of adequate effective medicines	15 (44.12)	20 (50.0)	16 (17.58)	0	26 (13.27)	0	1 (0.67)	0	0	3 (1.84)	55 15.71	54 17.03	190 (11.56)
5.	Problems on Cleanliness/ Sanitation	3 (8.82)	0	45 (49.45)	0	21 (10.71)	21 (21.65)	44 (29.53)	64 (100)	29 (49.15)	51 (31.29)	21 6.00	42 13.25	341 (20.75)
6.	Drinking water problem	0 (0.00)	0	5 (5.49)	0	19 (9.69)	31 (31.96)	54 (36.24)	0	15 (25.42)	5 (3.07)	34 9.71	35 11.04	198 (12.05)
7.	Work related stress	0 (0.00)	0	6 (6.59)	0	16 (8.16)	0	8 (5.37)	0	0	0	9 2.57	15 4.73	54 (3.29)
8.	Others	0 (0.00)	0	15 (16.48)	83 (100)	15 (7.65)	22 (22.68)	8 (5.37)	0	15 (25.42)	0	64 18.29	62 19.56	284 (17.29
9.	Total	34 (100)	40 (100)	91 (100)	83 (100)	196 (100)	97 (100)	149 (100)	64 (100)	59 (100)	163 (100)	350	317 100	1643 (100.0)

Figures in parentheses indicate percentage to total

The state level analysis of the sample respondent households indicated that lack of cleanliness/ poor sanitation was the major problem perceived in most of the states. Access to safe drinking water was also one of the major problems perceived by the respondents. Furthermore, infrastructure facilities and unavailability of effective doctors and medicines were the problems needs to be addressed for better medical care.

Table 4.25: Suggestions to improve health care facilities (Frequency)

Sl. No.	Suggestions	AP	AS	B.H	GU	HP	JH	KR	M.P.	OR	T N	UP	WB	Total	Per-centage
1	Increase the number of doctors/specialists	8 (20.00)	26 (50.98)	0 (0.00)	8 (6.67)	31 (19.87)	0 (0.00)	11 (9.40)	49 (76.56)	8 (13.56)	21 (12.96)	60 (20.91)	23 (14.11)	245	17.41
2	Make quarters facility for doctors so that they are available 24 x 7	6 (15.00)	0 (0.00)	4 (4.40)	0 (0.00)	28 (17.95)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	67 (41.36)	55 (19.16)	47 (28.83)	207	14.71
3	Make available sufficient medicines for all diseases with free of cost	19 (47.50)	25 (49.02)	16 (17.58)	15 (0.00)	25 (16.03)	23 (23.71)	7 (5.98)	15 (23.44)	15 (25.42)	3 (1.85)	46 (16.03)	68 (41.72)	277	19.69
4	Construct the modern hospital with all infrastructure and health care facilities.	5 (12.50)	0 (0.00)	45 (49.45)	29 (12.50)	22 (14.10)	0 (0.00)	11 (9.40)	0 (0.00)	0 (0.00)	21 (12.96)	45 (15.68)	3 (1.84)	181	12.86
5	Provide ambulance for emergency (especially during delivery accidents, etc.)	2 (5.00)	0 (0.00)	5 (5.49)	19 (24.17)	21 (13.46)	0 (0.00)	7 (5.98)	0 (0.00)	0 (0.00)	0 (0.00)	39 (13.59)	2 (1.23)	95	6.75
6	Need of good quality drinking water	0 (0.00)	0 (0.00)	6 (5.49)	7 (15.83)	16 (10.26)	22 (22.68)	39 (33.33)	0 (0.00)	16 (27.12)	50 (30.86)	24 (8.36)	5 (3.07)	185	13.15
7	Other	0 (0.00)	0 (0.00)	15 (16.48)	42 (35.00)	13 (8.33)	52 (53.61)	42 (35.90)	0 (0.00)	20 (33.90)	0 (0.00)	18 (8.36)	15 (9.20)	217	15.42
8	Total	40	51	91	120	156	97	117	64	59	162	287	163	1407	

Figures in parentheses indicate percentage to total

(xii) Suggestions to improve healthcare facilities

The respondent households opined on the different suggestions for improving the health care facilities and the details are furnished in Table 4.25.

The major suggestions made by the respondents were providing sufficient medicines for all diseases free of cost (19.69 per cent), increasing the number of doctors/specialists (17.41 per cent), others (15.42 per cent), construction of quarters facility for doctors so that they are available 24 x 7 (14.71 per cent), good drinking water facility (13.15 per cent), construction of the modern hospital with all infrastructure and healthcare facilities (12.86 per cent) and provision of ambulance for emergency, especially during delivery and accidents, etc. (6.75 per cent).

It was found that the maximum responses for suggestion were from Uttar Pradesh (287) followed by West Bengal (163), Tamil Nadu (162), Himachal (156) and Kerala (117). For all the other states the responses were less than 100. The suggestions made by the respondents varied across the states. In Uttar Pradesh and Himachal Pradesh maximum respondents opined for increasing the number of doctors/specialists, while in West Bengal demand for availability of free medicine was prominent. The suggestion of making quarters for the doctors to ensure their availability was also highlighted by the respondent across the states.

D) Income Profile

The income profile of the respondent households were analyzed using income patterns, respondents involvement in non fisheries activities and expenditure pattern. In addition the indebtedness and savings were analyzed using details on savings, indebtedness, sources of lending organization, purpose of availing loan and suggestions for enhancing the income and employment generation.

Fig 4.31 Fisher's house in Assam

(i) Monthly Income pattern

The income pattern of the respondent household was analyzed using the monthly income across the inland states of India Table 4.26.

Table 4.26 Income status of the respondents (Monthly Rs.)

Sl. No.	State	Enterprise					
		Fishery	Labour	Agriculture	Business	Any others	Total
1.	Andhra Pradesh	5515.47 (56.51)	2983.85 (30.57)	929.1 (49.52)	331.00 (3.39)	0.00 (0.00)	9759.47 (100.00)
2.	Assam	1425.21 (73.00)	202.00 (10.35)	65.50 (3.35)	309.50 (15.85)	0.00 (0.00)	1952.46 (100.00)
3.	Bihar	404.10 (70.29)	108.96 (18.95)	40.97 (7.13)	13.89 (2.42)	6.94 (1.21)	574.86 (100.00)
4.	Gujarat	1157.99 (18.39)	1460.71 (23.20)	1396.39 (22.17)	2282.26 (36.24)	0.00 (0.00)	6297.34 (100.00)
5.	Himachal Pradesh	1512.00 (40.91)	832.00 (22.51)	595.00 (16.10)	480.00 (12.99)	277.00 (7.49)	3696.00 (100.00)
6.	Jharkhand	467.20 (64.24)	131.20 (18.04)	57.50 (7.91)	71.50 (9.83)	0.00 (0.00)	727.30 (100.00)
7.	Kerala	1284.40 (82.20)	206.49 (13.21)	9.88 (0.63)	17.48 (1.12)	44.36 (2.84)	1562.55 (100.00)
8.	Madhya Pradesh	530.50 (99.42)	3.10 (0.58)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	533.60 (100.00)
9.	Orissa	589.00 (94.82)	0.00 (0.00)	3.40 (0.55)	28.80 (4.64)	0.00 (0.00)	621.20 (100.00)
10.	Tamil Nadu	1593.61 (85.12)	254.18 (13.58)	0.00 (0.00)	0.00 (0.00)	24.43 (0.00)	1872.23 (100.00)
11.	Uttar Pradesh	1942.00 (49.96)	844.50 (21.73)	498.50 (12.82)	474.50 (12.21)	128.00 (3.29)	3887.00 (100.00)
12.	West Bengal	685.14 (49.57)	575.38 (41.63)	138.33 (10.01)	204.56 (14.80)	47.03 (3.40)	1382.18 (100.00)
13.	Total	1333.78 (52.15)	576.70 (22.55)	297.37 (11.63)	377.78 (14.77)	74.33 (2.91)	2557.58 (100.00)

Figures in parentheses indicate percentage to total

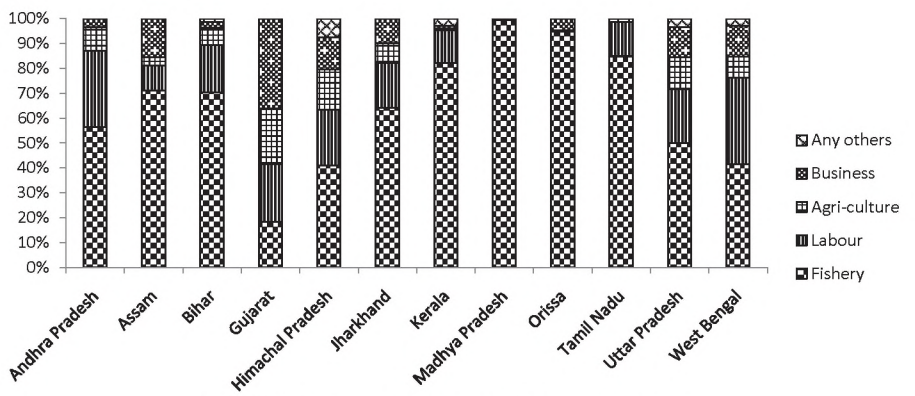


Fig. 4.32 Income percentage of the respondents

The major income sources of the respondent households were income from fishery, business, agriculture, labour services, and other service sectors (Figure. 4.32). The highest monthly average income generated across the states was through fisheries sector with an average amount of Rs. 1333.78 (52.15 % of the total income) followed by income from labour sector at Rs.576.7 at (22.55 %), business at Rs 377.78 (14.77 %) and agricultural sector at Rs 297.31 (11.63 %).

Fig. 4.33 Fisher boat at river bank with fish catch

The state wise monthly income status of the respondents indicated that Andhra has the highest income from fisheries sector Rs 5515.47 (56.51% of the total income). The lowest income was registered at Madhya Pradesh with Rs 530.5. The monthly income of the fishers of Orissa, Jharkhand and Bihar was less than Rs 1,000/with major share from fisheries reveals poor economic statndard of fisher households

The monthly income of fishers of Andhra Pradesh, Gujarat, Tamil Nadu and Himachal from fisheries sector was estimated at Rs. 5515, Rs. 1157, Rs.1593 and Rs.1512 respectively. Other than fisheries sector they were depending on agriculture,business and labour for getting additional income.

(ii) Involvement in non fisheries activities

Involvement of respondent' households in non fisheries activities are illustrated in the Table 4.27 and Figure 4.34.

The analysis on the respondent household's involvement in non fisheries activities indicated that 733 respondents were involved in non-fisheries activities, which provided an additional source of income. The major non fishing activities involved by respondents were labour, agriculture, business, and other service sectors with a participation of 54.16, 19.37, 18.83 and 7.64 per cent of fishers respectively. The total number of respondents involved in labour ranged between 0-100 per cent for Orissa and Madhya Pradesh. For agriculture it varied from 0-38.57 per cent from Madhya Pradesh to Jharkhand. The result clearly indicated the existence and practice of alternative avocation holds good in the selected respondent households.

Table 4.27: Respondent's involvement in non-fisheries activities

Sl. No.	State	Respondents involvement in non-fisheries activities				
		Labour	Agriculture	Business	Any others	Total
1.	Andhra Pradesh	50 (40.98)	40 (32.79)	28 (22.95)	4 (3.28)	122 (100.00)
2.	Assam	24 (27.91)	19 (22.09)	43 (50.00)	0 (0.00)	86 (100.00)
3.	Bihar	31 (68.89)	9 (20.00)	4 (8.89)	1 (2.22)	45 (100.00)
4.	Gujarat	23 (65.71)	12 (34.29)	0 (0.00)	0 (0.00)	35 (100.00)
5.	Himachal Pradesh	21 (42.00)	5 (10.00)	18 (36.00)	6 (12.00)	50 (100.00)
6.	Jharkhand	31 (44.29)	27 (38.57)	12 (17.14)	0 (0.00)	70 (100.00)
7.	Kerala	27 (46.55)	3 (5.17)	7 (12.07)	21 (36.21)	58 (100.00)
8.	Madhya Pradesh	1 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.00)
9.	Orissa	0 (0.00)	1 (12.50)	7 (87.50)	0 (0.00)	8 (100.00)
10.	Tamil Nadu	48 (97.96)	0 (0.00)	0 (0.00)	1 (2.04)	49 (100.00)
11.	Uttar Pradesh	70 (70.00)	10 (10.00)	4 (4.00)	16 (16.00)	100 (100.00)
12.	West Bengal	71 (65.14)	16 (14.68)	15 (13.76)	7 (6.42)	109 (100.00)
13.	Total	397 (54.16)	142 (19.37)	138 (18.83)	56 (7.64)	733 (100.00)

Figures in parentheses indicate percentage to total

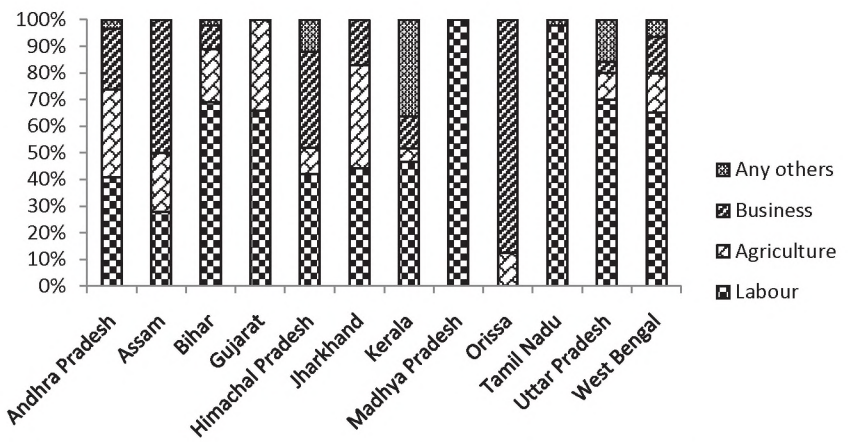


Fig. 4.34: Respondents involvement in non-fisheries activities in per cent

(iii) Pattern of expenditure

The major household expenses measured include expenditure on food, clothing, fuel, medical, education, entertainment, personals and durables. The result of the pattern of monthly expenditure is represented in Table 4.28 and Figure 4.35.

The average monthly expenditure pattern of the households worked out at Rs. 2084.20. Expenses on food shared 50.68 percent of the total income (Rs. 1,056.37) followed by education with 9.37 percent (Rs. 195.27).The least expenditure was Rs. 65.04 (3.12 %) on entertainment.

Table 4.28: Monthly expenditure pattern of the fisher family (Rs.)

Sl. No.	State	Food	Clothing	Fuel	Medical	Education	Entertain-ment	Personal	Durables	Total
1	Andhra Pradesh	4653.77 (39.93)	1420.57 (12.19)	480.60 (4.12)	1333.11 (11.44)	1961.08 (16.83)	309.85 (2.66)	416.83 (3.58)	1078.67 (9.26)	11654.48 (100.00)
2	Assam	1012.80 (71.52)	114.71 (8.10)	10.00 (0.71)	126.33 (8.92)	32.00 (2.26)	6.17 (0.44)	114.18 (8.0)	0.00 (0.00)	1416.18 (100.00)
3	Bihar	297.78 (66.89)	24.17 (5.43)	24.17 (5.43)	21.71 (4.88)	27.75 (6.23)	6.11 (1.37)	27.22 (6.11)	16.25 (3.65)	445.16 (100.00)
4	Gujarat	1792.94 (54.24)	304.22 (9.20)	265.84 (8.04)	118.79 (3.59)	313.16 (9.47)	75.26 (2.28)	69.78 (2.11)	365.52 (11.06)	3305.50 (100.00)
5	Himachal Pradesh	995.003 (40.83)	265.00 (10.87)	54.00 (2.22)	260.00 (10.67)	324.00 (13.30)	53.00 (2.17)	233.00 (9.56)	253.00 (10.38)	2437.00 (100.00)
6	Jharkhand	335.90 (55.57)	25.60 (4.23)	62.20 (10.29)	19.90 (3.29)	43.90 (7.26)	33.30 (5.51)	54.70 (9.05)	29.00 (4.80)	604.50 (100.00)
7	Kerala	564.55 (44.66)	91.80 (7.26)	46.98 (3.72)	80.80 (6.39)	58.51 (4.63)	24.53 (1.94)	131.39 (10.39)	265.63 (21.01)	1264.19 (100.00)
8	Madhya Pradesh	289.90 (56.01)	28.50 (5.51)	0.00 (0.00)	37.70 (7.28)	18.80 (3.63)	40.20 (7.77)	101.20 (19.55)	1.30 (0.25)	517.60 (100.00)
9	Orissa	306.80 (57.79)	28.60 (5.39)	33.30 (6.27)	21.00 (3.96)	20.30 (3.82)	48.30 (9.10)	55.50 (10.45)	17.10 (3.22)	530.90 (100.00)
10	Tamil Nadu	552.76 (53.52)	88.07 (8.53)	60.54 (5.86)	118.74 (11.50)	66.64 (6.45)	52.05 (5.04)	25.85 (2.50)	68.20 (6.60)	1032.85 (100.00)
11	Uttar Pradesh	1958.00 (54.98)	242.00 (6.80)	119.50 (3.36)	213.00 (5.98)	121.00 (3.40)	166.50 (4.68)	530.50 (14.90)	210.50 (5.91)	3561.00 (100.00)
12	West Bengal	746.53 (62.90)	48.63 (4.10)	82.25 (6.93)	84.24 (7.10)	69.88 (5.89)	37.56 (3.16)	107.67 (9.07)	10.12 (0.85)	1186.90 (100.00)
	Total	1056.37 (50.68)	186.05 (893)	96.61 (4.64)	166.37 (7.98)	195.27 (9.37)	65.04 (3.12)	150.80 (7.24)	167.69 (8.05)	2084.20 (100.00)

Figures in parentheses indicate percentage to total

The total expenditure pattern of the selected states indicates that the highest household expenditure was noticed in Andhra Pradesh with an average amount of Rs. 11654.48 and the least in Madhya Pradesh with Rs. 517. The expenses on food were the major item of expenditure for most of the states followed by clothing, education, purchase of durables and other components.

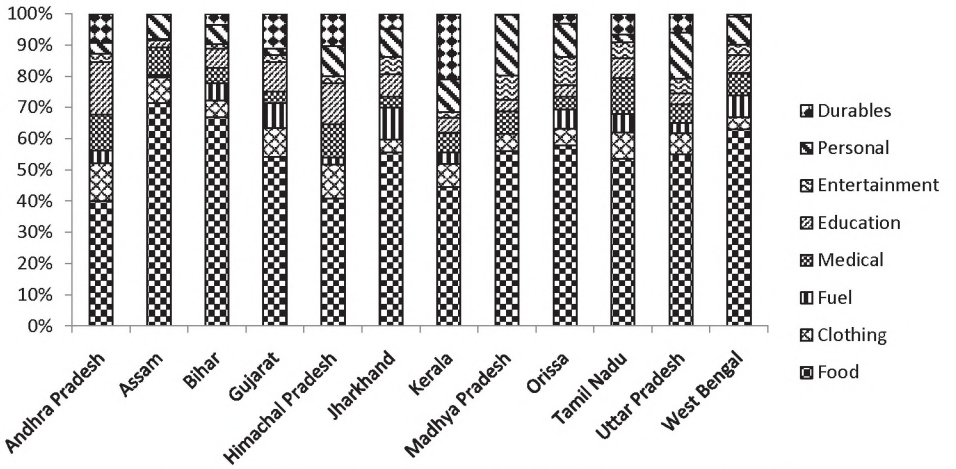


Fig. 4.35 : Pattern of expenditure of the fisher family (per cent)

(iv) Indebtedness and Savings

The saving pattern of the respondent households are indicated in Table 4.29. The saving details of the respondent's households indicated that 35.44 per cent of the respondents have no savings. 52.45 per cent of the respondent households possessed a saving of less than Rs 50000. 9.92 per cent of the respondents have a saving of Rs 50000-100000. Around 2.2 per cent of the respondent households had a savings of more than one lakh rupee. The details on the frequency of respondents having saving across the inland states is graphically represented in Figure 4.36.

It was found that the frequency of respondents possessing savings varied across the states. It was found that not even a single fisherman of Andhra Pradesh was having saving. The amount of saving was very less in the states of Madhya Pradesh, Bihar, Orissa, etc, on account of their poor income levels. But the frequency of respondents with saving was more. On contrary, the percentage of respondents with saving was less for Kerala and Uttar Pradesh, but the amount saved was more.

Table 4.29: Saving detailes of respondent's households

Sl. No.	State	Frequency of respondents having Savings				Total
		Nil	< 50 k	50-100.00k	>100.00K	
1.	Andhra Pradesh	53(100.00)	0 (0.00)	0 (0.00)	0 (0.00)	53 (100.00)
2.	Assam	10 (12.50)	68 (85.00)	2 (2.50)	0 (0.00)	80 (100.00)
3.	Bihar	7 (11.67)	53 (88.33)	0 (0.00)	0 (0.00)	60 (100.00)
4.	Gujarat	10 (22.73)	29 (65.91)	5 (11.36)	0 (0.00)	44 (100.00)
5.	Himachal Pradesh	0 (0.00)	0 (0.00)	50 (100.00)	0 (0.00)	50 (100.00)
6.	Jharkhand	0 (0.00)	66 (84.62)	3 (3.85)	9 (11.54)	78 (100.00)
7.	Kerala	47 (50.54)	32 (34.41)	7 (7.53)	7 (7.53)	93 (100.00)
8.	Madhya Pradesh	0 (0.00)	12 (75.00)	3 (18.75)	1 (6.25)	16 (100.00)
9.	Orissa	0 (0.00)	43 (100.00)	0 (0.00)	0 (0.00)	43 (100.00)

10	Tamil Nadu	87 (93.55)	6 (6.45)	0 (0.00)	0 (0.00)	93 (100.00)
11.	Uttar Pradesh	36 (36.00)	60 (60.00)	4 (40.00)	0 (0.00)	100 (100.00)
12.	West Bengal	25 (37.88)	38 (57.58)	3 (4.55)	0 (0.00)	66 (100.00)
13.	Total	275 (35.44)	407 (52.45)	77 (9.92)	17 (2.19)	77 (100.00)

Figures in parentheses indicate percentage to total

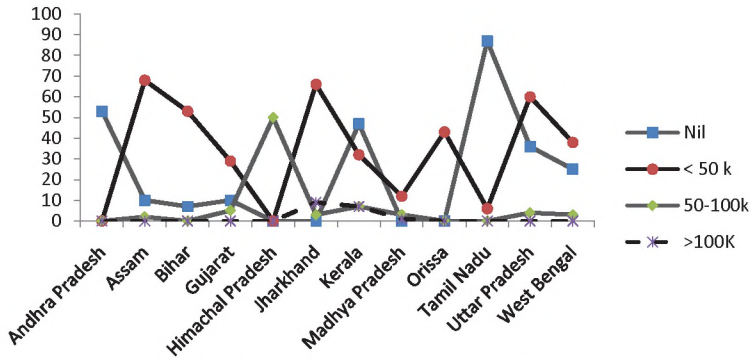


Fig 4.36 Frequency of saving pattern

(v) Indebtedness of the respondents households

The lack of savings and the need for increased expenditure for mere sustenance often lead to indebtedness. The pattern of indebtedness of respondent households across the different inland states of India is discussed in Table 4.30.

Table 4.30 Indebtedness of respondent's households

Sl. No.	State	Indebtedness			
		Number of persons	Average amount per person	Average amount repaid	per cent repay-ment
1.	Andhra Pradesh	40	75025	15200	20.26
2.	Assam	4	25000	14236	56.94
3.	Bihar	20	6350	2167.5	34.13
4.	Gujarat	15	7930	6046	76.24
5.	Himachal Pradesh	3	88750	49375	55.63
6.	Jharkhand	78	6547	1076.9	16.45
7.	Kerala	77	38856	14419	37.11
8.	Madhya Pradesh	16	2262.5	1050	46.41
9.	Orissa	43	539	465.1	86.29
10.	Tamil Nadu	75	14927	3749	25.12
11.	Uttar Pradesh	46	14754	3006	20.37
12.	West Bengal	61	40488	23139	57.15
13	Total	478	21133.40	9778.59	46.27

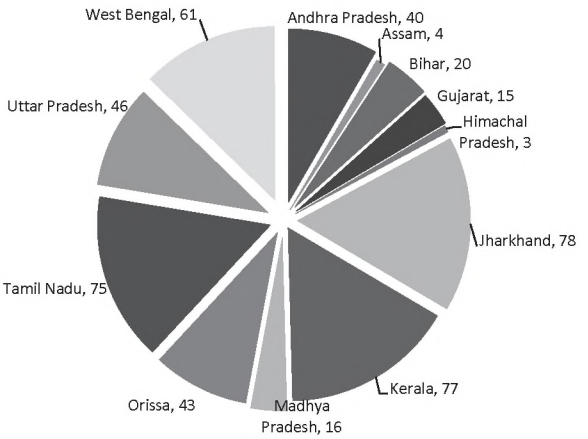


Fig. 4.37 Indebtedness across the statesv

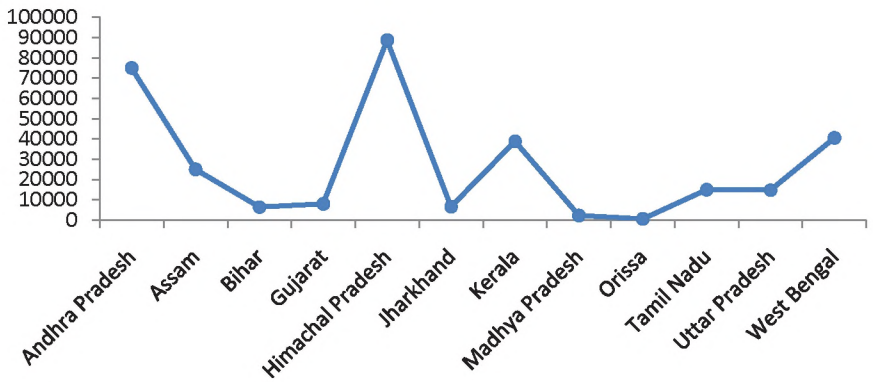


Fig. 4.38 The average loan per person

The results indicated that the average amount of indebtedness per person was Rs 21133.40 in which the highest average amount of indebtedness was recorded in Andhra Pradesh with Rs 75025. The highest number of respondents who borrowed money for different purposes was found in Jharkhand (78) followed by Kerala (77), Tamil Nadu (75), and West Bengal (61). It was found that in Himachal Pradesh and Assam only few have availed credit.

Though the number of persons in indebtedness was high in Jharkhand, the average amount of indebtedness per person was comparatively low with Rs. 6547. The lowest amount of loan was in Orissa at Rs 539 followed by Rs. 6350 for Bihar. The level of indebtedness across the fishers is depicted in Figure. 4.37 and 4.38

On an average 46.27 per cent of the total loan amount was repaid. The analysis of repayment of the loans indicated that 86.29 per cent of loan was repaid by fishers of Orissa and 76.24 per cent of the loan amount by fishers of Gujarat. The lowest repayment percentage was for Jharkhand (16.45) followed by Andhra and Uttar Pradesh at 20.06 and 20.37 per cent. The level of repayment also depends on the age of the loan. But overall scenario of the repayment was comparatively better considering the poor conditions of the fisher community.

(vi) Sources of lending

The indebtedness often resulted in availing loans from the different institutions. The major sources of lending include banks, co-operatives, private money lenders, friends/relatives and jewel loans. The distribution of loans across the sources is described in Table 4.31.

A total of 478 respondents had availed loans for various purposes. It was found that private money lenders constituted the major source of lending with 36.69 per cent of loans availed by the households. Banks provided credit to 27.13 per cent of respondents followed by other sources like LIC, SHG, etc.,with a contribution of 17.57 per cent (Figure 4.39)

Cooperatives were also a good source of loan for 13.95 percent of respondents and it was the most important funding source in Kerala (47.37 per cent). Whereas banks were the most popular source in Jharkhand (91.67 per cent) and self help groups were popular in Tamil Nadu (56.00 per cent).

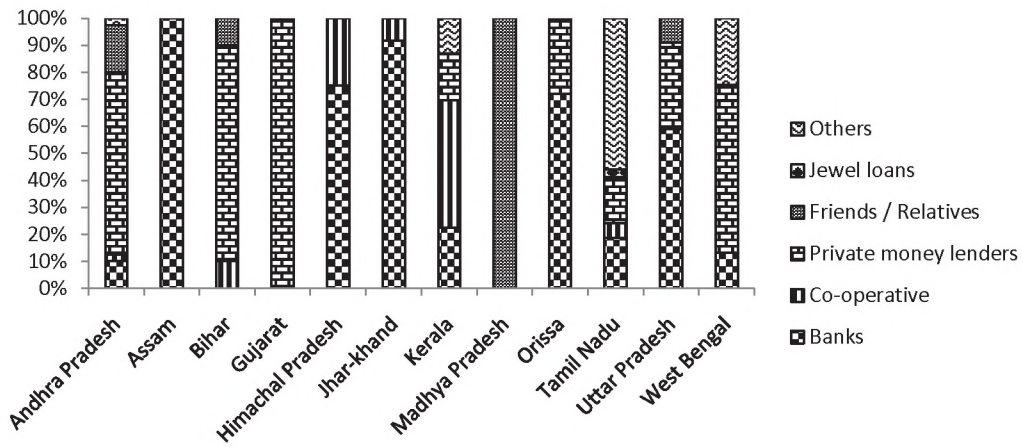


Fig. 4.39: Sources of lending

(vii) Purpose of availing loans

The details on the purpose of availing loans and number of loans availed by the respondent households are indicated in Table 4.32.

The major purposes for which loans were availed included purchase of craft/ gear and other fishing related equipments, house construction/land purchase, marriage expenses., education and health and social security etc.

It was found that of the 387 respondents availed loans, around 25 per cent availed it for business and preparations for marriage in the family. Over 23 per cent of the fishers availed loan for purchase of gears and other fishing related equipments. House construction and land purchase found importance among 13.44 per cent of the respondent households. The loans for education health and social security were taken by 8.01 and 491 per cent respondents. The details on the purpose of availing loans across states are represented in Figure 4.40.

Table 4.31 Sources of lending

Sl. No.	Sources	Andhra Pradesh	Assam	Bihar	Gujarat	Himachal Pradesh	Jhar-khand	Kerala	Madhya Pradesh	Orissa	Tamil Nadu	Uttar Pradesh	West Bengal	Total
1.	Banks	4 (10.00)	4 (100.00)	0 (0.00)	0 (0.00)	3 (75.00)	11 (91.67)	17 (22.37)	0 (0.00)	31 (72.09)	14 (18.67)	13 (41.94)	8 (13.11)	105 (27.13)
2.	Co-operative	1 (2.50)	0 (0.00)	2 (10.00)	0 (0.00)	1 (25.00)	1 (8.33)	36 (47.37)	0 (0.00)	0 (0.00)	4 (5.33)	(29.03)	0(0.00)	54 (13.95)
3.	Private money lenders	27 (67.50)	0 (0.00)	16 (80.00)	16 (100.0)	0 (0.00)	0 (0.00)	13 (17.11)	0 (0.00)	12 (27.91)	13 (17.33)	7 (22.58)	38 (62.30)	142 (36.69)
4.	Friends / Relatives	7 (17.50)	0 (0.00)	2 (10.0)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	5 (100.00)	0 (0.00)	0(0.00)	2(6.45)	0(0.00)	16(4.13)
5.	Jewel loans	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	2(2.67)	0(0.00)	0(0.00)	2(0.52)
6.	Others (SHGs/ LIC, etc)	1 (2.50)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (13.16)	0 (0.00)	0 (0.00)	42 (56.00)	0(0.00)	15 (24.59)	68 (17.57)
7.	Total	40 (100.00)	4 (100.00)	20 (100.00)	16 (100.00)	4 (100.00)	12 (100.00)	76 (100.00)	5 (100.00)	43 (100.00)	75 (100.00)	31 (100.00)	61 (100.00)	387 (100.00)

Figures in parentheses indicate percentage to total

Table 4.32: Purpore of availing loans

Sl.No:	Purpose	A P	Assam	Bihar	Gujarat	H P	Jhar-khand	Kerala	Madhya Pradesh	Orissa	Tamil Nadu	U P	West Bengal	Total
1.	Purchase of craft/ gear and other fishing related equipments	4 (10.00)	4 (100.00)	0 (0.00)	1 (6.25)	3 (75.00)	1 (8.33)	10 (13.16)	0 (0.00)	31 (72.09)	14 (18.67)	16 (51.61)	6 (9.84)	90 (23.26)
2.	House construc-tion / Land purchase	1 (2.50)	0 (0.00)	2 (10.00)	12 (75.00)	1 (25.00)	1 (8.33)	19 (25.00)	0 (00.00)	0 (0.00)	7 (9.33)	3 (9.68)	6 (9.84)	52 (13.44)
3.	Marriage expense	27 (67.50)	0 (0.00)	16 (80.00)	0 (0.00)	0 (0.00)	0 (0.00)	17 (22.37)	0 (0.00)	12 (27.91)	2 (2.67)	5 (16.13)	19 (31.15)	98 (25.32)
4.	Education	7 (17.50)	0 (0.00)	2 (10.0)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	5 (100.00)	0 (0.00)	6 (8.00)	1 (3.23)	10 (16.39)	31 (8.01)
5.	Health and Social Security	0 (0.00)	0 (0.00)	0 (0.00)	1 (6.25)	0 (0.00)	0 (0.00)	6 (7.89)	0 (0.00)	0 (0.00)	9 (12.00)	0 (0.00)	3 (4.92)	1 (4.91)
6.	Any others (busi-ness and purchase of vehicle	1 (2.50)	0 (0.00)	0 (0.00)	2 (12.50)	0 (0.00)	10 (83.33)	24 (31.58)	0 (0.00)	0 (0.00)	37 (49.33)	6 (19.35)	17 (27.87)	97 (25.06)
7.	Total	40 (100.00)	4 (100.00)	20 (100.00)	16 (100.00)	4 (100.00)	12 (100.00)	7 (100.00)	5 (100.00)	43 (100.00)	75 (100.00)	31 (100.00)	61 (100.0)	387 (100)

Figures in parentheses indicate percentage to total

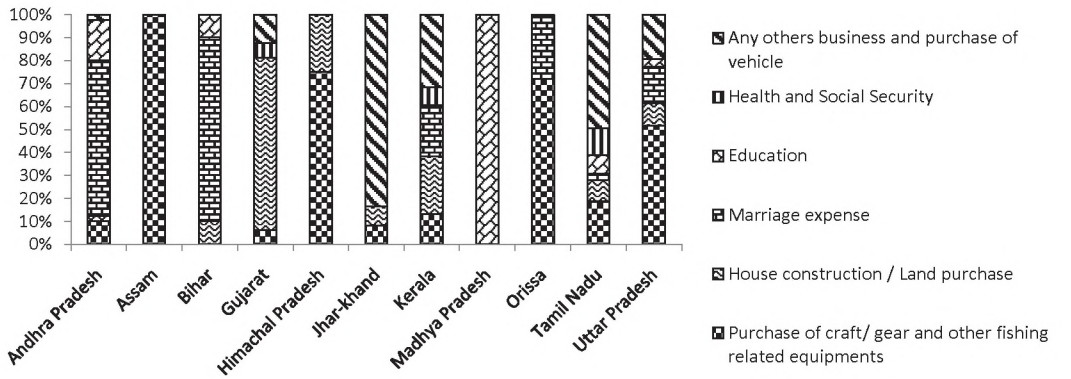


Fig 4.40. Purpose of availing loans (Per cent distribution)

(viii) Suggestions to enhance the income and employment generation

Suggestions from respondents regarding various options to enhance income and employment of fishermen is indicated in Table 4.33.

The major suggestions perceived by the households included arranging the institutional financial support like micro credit for fisher folk; SHG, etc, regulation of fish marketing through institutional interventions; vocational training for fisher women to undertake house hold income activities during dry/off season; regulation of PDS and supply of the basic food items and fuel (like kerosene, LPG etc) by the Govt. agencies and provision of rural infrastructure for general societal/human development.

The first option as perceived by 18.89 per cent of the respondents was arranging institutional financial support like micro credit for fisheries, SHG, etc. It can provide a major impetus for enhancing income and employment. Another 16.46 percent of the respondents suggested the need for making regulation of fish marketing through institutional interventions and vocational training for fisher women to undertake household income activities during dry/ off season and provision of rural infrastructure for general societal / human development. Regulation of PDS and supply of the basic food items and fuel (like kerosene, LPG, etc) by the Govt. agencies was found to be a good option for 14.8 percent of the respondents(Fig 4.41)

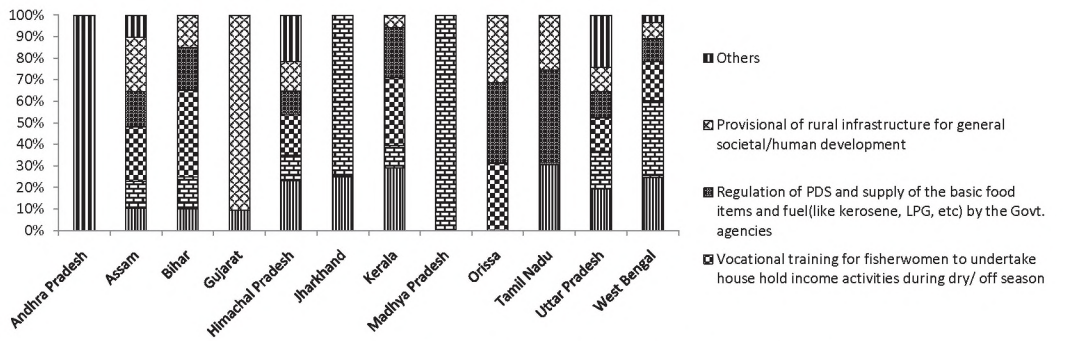


Fig 4.41 Suggestions for enhance the income and employment generation of fishermen (Percentage response)

Table 4.33: Suggestions for enhance the income and employment generation of fishermen (Percentage response)

Sl.No:	Suggestions	Andhra Pradesh	Assam	Bihar	Gujarat	Himachal Pradesh	Jharkhand	Kerala	Madhya Pradesh	Orissa	Tamil Nadu	Uttar Pradesh	West Bengal	Total
(i)	Arranging the institutional financial support like micro credit for fisheries, SHG, etc	0 (0.00)	5 10.42)	2 (10.00)	5 (9.43)	17 (22.97)	4 (25.00)	25 (29.07)	0 (0.00)	0 (0.00)	18 (30.51)	84 (19.31)	34 (24.64)	194 (18.89)
(ii)	Regulation of fish marketing through institutional interventions	0 (0.00)	6 (12.50)	3 (15.00)	0 (0.00)	9 (12.16)	12 (75.00)	9 (10.47)	5 (100.00)	0 (0.00)	0 (0.00)	76 (17.47)	49 (35.51)	169 (16.46)
(iii)	Vocational training for fisherwomen to undertake house hold income activities during dry/ off season	0 (0.00)	12 (25.00)	8 (40.00)	0 (0.00)	14 (18.92)	0.00	27 (31.25)	0.00	15 (31.25)	0 (0.00)	68 (15.63)	25 (18.12)	169 (16.46)
(iv)	Regulation of PDS and supply of the basic food items and fuel(like kerosene, LPG, etc) by the Govt. agencies	0 (0.00)	8 (16.67)	4 (20.00)	0 (0.00)	8 (10.81)	0 (0.00)	20 (23.26)	0 (0.00)	18 (37.50)	26 (44.07)	53 (12.18)	15 (10.87)	152 (14.80)
(v)	Provisional of rural infrastructure for general societal/human development	0 (0.00)	12 (25.00)	3 (15.00)	48 (90.57)	10 (13.51)	0 (0.00)	5 (5.81)	0 (0.00)	15 (31.25)	15 (25.42)	48 (11.03)	10 (7.25)	166 (16.16)
(vi)	Others	45 (100.00)	5 (10.42)	0 (0.00)	0 (0.00)	16 (21.62)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	106 (0.00)	5 (3.62)	177 (17.23)
(vii)	Total	45	48	20	53	74	16	86	5	48	59	435	138	1027

Figures in parentheses indicate percentage to total

Coldwater Fisheries 05

05

Coldwater Fisheries

B. Ganesh Kumar, Shyam S. Salim and Pradeep Katiha

The background

The potential cold areas in India include the long stretch of Himalayas of around 2500 km from west to east and 200-400 km from north to south comprising an area of 594,400 km^2. These area have different types of coldwater resources: upland streams, rivers, high and low altitudinal lakes and reservoirs located in different hill states of India. Around 8,243 km long streams and rivers, 20,500 ha natural lakes, 50,000 ha of reservoirs both natural and manmade and 2500 ha brackishwater lakes at high altitude inhabits large population of indigenous and exotic coldwater fish species in these mountain water bodies which have immense potential for aquaculture practices as well as capture fisheries. The temperature limits of such water bodies are 10-20 ^{0}C with an optimum range from 10-12 ^{0}C. These water bodies are situated about 914 m above mean sea level in India. The mountain areas are mostly landlocked; hence the fish of lakes, streams, rivers and reservoirs are an important source of animal protein. Even though there are certain limitations of cold water fisheries such as accessibility, difficult hilly terrain, lack of proper market, recent success of developing aquaculture in mountain areas of India shows that fish farmers in the rural areas can become the direct beneficiaries of the implementation of inexpensive aquaculture technologies, and as a consequence they achieve significant improvement in their standard of living. As fisheries play an important role in providing food and income to people in mountain areas, they must be integrated into the rural development and water resource development initiatives. The majority of dependents on fish as means of livelihood are now facing problems to meet their both ends owing to sharp decline in fish catch in the upland areas. Keeping in view the squeezing land and burgeoning human ratio, mountain fish resource base is of great relevance and development of such areas becomes matter of national concern, which needs different technological approach and support services. Such regions have to be tapped for increased fish production for national basket and rural development in hills.

In the Indian Sub-continent two main types of trout's viz. brown trout (*Salmo trutta fario*) and rainbow trout (*Oncorhynchus mykiss* (Walbaum)), were transplanted from Europe by British settlers around the beginning of the last century primarily to meet their needs for sport fishing or recreational angling. These introductions in the hill states could be considered as the formal

beginning of coldwater fisheries development in India. For many decades the mere intention remained was to develop recreational fisheries to satisfy the needs of anglers for sports. Later on, these species were being cultured for food and hatcheries were setup for the production of seed. The development of hill fisheries thus started in the selected locations particularly in the Kashmir valley and some parts of the peninsular India. The breeding and culture techniques for the rainbow and brown trouts were standardized and now being practiced with great success and accuracy.

The aquatic resources available are quite valuable for the development of fishery both for food and sport, but scientific management of these resources is necessary to achieve the objectives. In order to manage these ecosystems, so that they can contribute to fishery development in remote hilly regions on a sustainable basis, the following issues need attention.

- Low level of production
- Lack of Infrastructure for aquaculture
- Availability of seed for production
- Introduction of new candidate species for aquaculture
- Habitat destruction
- Wanton destruction
- Aquatic pollution
- Conservation policy
- Management policy
- Climate change

There is a vast scope and potential in improving fish production in hills by bringing natural Himalayan lakes, located at different altitudes, under scientific management for fishery enhancement. This would actually reduce the gap between actual fish yield and production potentials. Through application of modern techniques, significant scope exists for promoting trout farming, which in long run, will have both domestic and export demand. There is also a great potential for sport fishery development and ecotourism in hilly regions. Use of modern techniques such as molecular and biotechnological intervention, selective breeding programme for improvement of strains both of exotic and indigenous species, cold water fish health management for the containment of diseases have now become imperative. Providing decision support system using GIS and remote sensing would be helpful not only for resource assessment but also for aquaculture development in the hills. Ornamental fish culture for small-scale enterprises in the hills can provide an alternative source of employment. The upland regions are fragile in nature therefore it has to be conserved and must be used on a sustainable basis.

Scope of the study

The socio-economic study of hill fishing populace is one of the rarest, this pilot study will provide a baseline information and framework for drawing suitable programmes for the upliftment of traditional fisher folk with particular focus on their literacy, health, employment and income profiling. In short, the study will be highly useful to researchers, planners and policy makers in overcoming the problems of the socio economic parameters which determines the sustained development of the fisher folk.

Objective

The overall objectives of the study is to document the socioeconomic status of fishers in cold regions of the Indian states including Himachal and Uttarakhand. However the specific objectives are to assess the status of literacy, health and income of inland fishers in India.

Duration of the Study

The study was conducted during the period from July 2010 to March 2011.

Methodology

The study was based on the data collected from primary and secondary sources. The primary data was collected from selected respondents using comprehensive and pre-tested questionnaires. The primary data had provided concise, clear, complete, and unbiased information about the respondent. The important variables considered for the study were gender, age, literacy, health, employment, income and indebtedness parameters

The distribution of cold water fisheries resources in India mentioned include rivers, ponds and lakes. The study covered 50 respondent households from two states Himachal Pradesh and Uttarakhand.

The sampling was done with random sampling method from the selected states, according to the magnitude of resource in that state. At the second stage important districts and area having the constituent water bodies were selected. Ultimately, the fishers operating in these inland waters were selected to collect the primary data. The study covered primarily the river and lake in Himachal and aquacultural resources in Uttarakhand. Combined information of all the selected states are presented for study parameters. The total households representing the coldwater fisheries and aquaculture sector and the distribution of the sample household is given in Table 5.1.

Table 5.1 Resource wise distribution of sample respondents in inland capture fisheries sector

SL. No.	State	Resource	Districts	Sample size
1.	Himachal Pradesh	River	Shimla, Sirmaur	25
2.	Uttarakhand	Aquaculture ponds	Champawat	25
3.	Total			50

Data Collection

The data collection was done using a pre structured survey schedule (Annexure-I) after a reconnaissance survey from the selected sample respondents. The data was collected on four parameters viz., the general particulars, literacy, health, and income profiling. It covered mostly rural. The data collection was done by the project team and trained enumerators. The data collected were tabulated and the results were analyzed.

Tools of Analysis

The data obtained from the respondents were systematically tabulated for the purpose of analysis. Conventional tools of analysis and percentage analysis was done to process the data and bring out the literacy, income and health status of the fishers in India and to arrive at meaningful conclusions.

Limitation of the study

The present study relied on primary data collected through the questionnaire survey. The inherent faults and limitations in the primary data collection like respondents' recall bias - due to the absence of proper records on their income, health details, expenditure, savings and indebtedness, etc with the respondents are to be recognized. The information was collected from the respondents based on their memory and experience and so the bias cannot be eliminated fully. But in the context of the study, care was taken to avoid personal bias while giving information. Apparent limitations like getting only seasonal information; having data that is for a specified period of time, depending on data that is word of mouth (with its inherent contradictions) as primary data should be considered. The income and expenditure pattern and health parameters of the respondents, subject to change in the short run as well as long run, also needed to be considered. This study was confined to the two randomly selected states of India.

Results and Discussions

The results and discussions are presented under the following heads

A. General particulars
B. Literacy status
C. Health status
D. Income status

A. General particulars

The general particulars of respondent households included age, family size, family composition etc.

(i) Age distribution

The age distribution of the respondent households is given in Table 5.2. The age of the respondents are categorized into three sub groups viz, young (15-35 year), middle age (36-55 year) and old (>56 year). In cold water fisheries, fishing continued to be an activity mostly done by fisher folk in the age group of 36-55 which constituted about 56 per cent of the respondents. The distribution also indicated that the group of young constituted (age less than 35) 32 & 20 per cent in Himachal & Uttrakhand, respectively. The fisher folk with age more than 56 were found to be only 12 & 24 per cent in the sampled state respectively. The average age of the cold water fishers was in the age group of 36-55 years.

Table 5.2: Age wise details of the sample respondents (years)

SL. No.	State	<=35	36-55	>=56	Total
1.	Himachal	8	14	3	25
		(32.00)	(56.00)	(12.00)	(100.00)
2.	Uttrakhand	5	14	6	25
		(20.00)	(56.00)	(24.00)	(100.00)
3.	Total	13	28	9	50
		(26.00)	(56.00)	(18.00)	(100.00)

Figures in parentheses indicate percentage to total

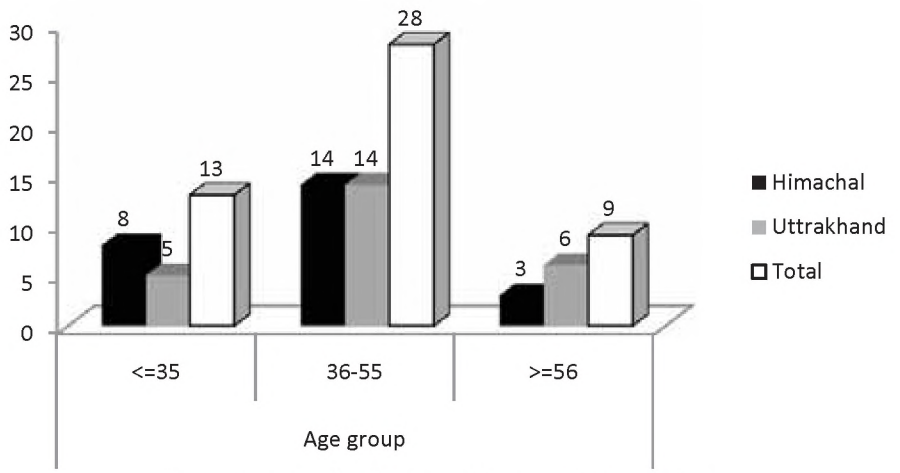


Figure 5.1: Age distribution of the sample respondent

(ii) Family composition

The family composition of the respondents is indicated in Table 5.5 and Fig. 5.2. It is seen from the table that the males surpassed the females in both the states. The average per cent of male and female in cold water fisheries was recorded at app. 60 & 40 per cent, respectively. The male female ratio was calculated to be 1.25 in Himachal and 1.89 in Uttrakhand together contributed to an average ratio of 1.47.

Table 5. 3: Household particulars of the sample respondents- male and female (Number)

Sl.No.	State	House-holds	Male	Female	Total	Male-Female ratio
1.	Himachal	25	69	55	124	1.25
			(55.65)	(44.35)	(100.00)	
2.	Uttrakhand	25	53	28	81	1.89
			(65.43	(34.57)	(100.00)	
3.	Total	50	122	83	205	1.47
			(59.51	(40.49)	(100.00)	

Figures in parentheses indicate percentage to total

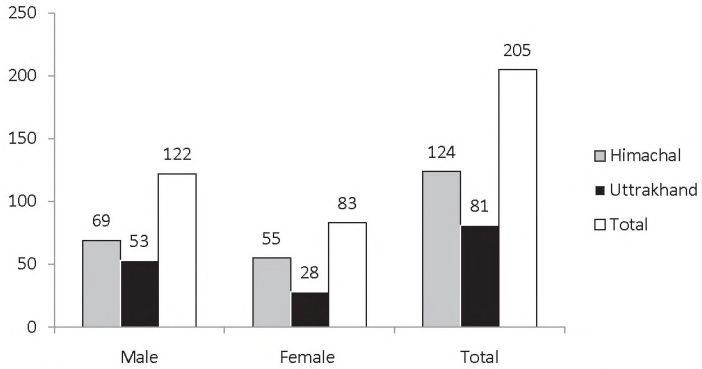


Figure: 5.2 Family composition of the respondent households-Male and Female (Number)

(iii) Family size composition

The average size of cold water fisheries in India is worked out to be 4.10 ranging from 3.24 in Uttrakhand and 4.96 in Himachal (Table 5.4 & Figure 5.3). The distribution of family type and family size of the respondents exhibited that 44.00 per cent of the total respondents were from small family having a size between 5 and 6. It was found that 42 per cent of the respondents belonged to the category of family size between 2 and 4. The results indicated that medium families and nuclear families were the characterstics in Himachal and Uttarakhand and are of almost similar fashion.

Table 5.4: Family size of the respondent households (Number)

Sl. No.	State	Sample	Family Size					Total	Average family size
			<2	2-4	5-6	7-10	>10		
1.	Himachal	25	0	8	15	2	0	25	4.96
			0	32.00	60.00	8.00	0.00	100.00	
2.	Uttrakhand	25	4	13	7	1	0	25	3.24
			16	52.00	28.00	4.00	0.00	100.00	
3.	Total	50	4	21	22	3	0	100	4.10
			8.00	42.00	44.00	6.00	0.00	100.00	

Figures in parentheses indicate percentage to total

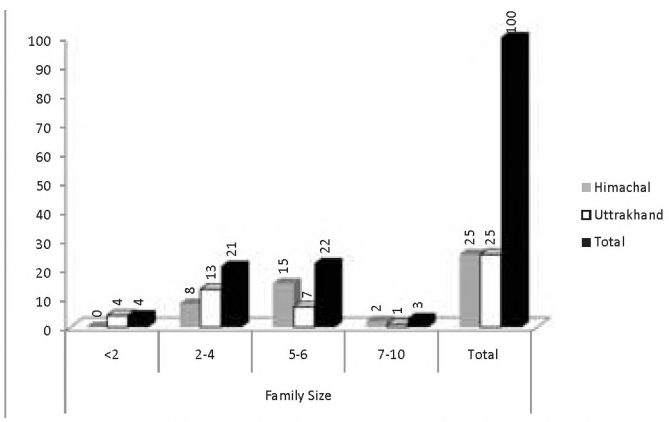


Figure 5. 3: Family size of respondent households

(iv) Age composition

The age composition of the respondent households is represented in Table 5.5. The age composition is represented by adults (more than 15 years) and children (less than 15 years). The table depicts that among male 68.85 were adults and 31.15 were children while among females 66.27 per cent were adults and 33.73 were children which is almost same in both the cases of sampled population.

Table 5.5: Age composition of the respondent households (Number)

Sl. No.	State	Adult (> =15 years)		Children (< 15 years)		Total		Dependency ratio
		Male	Female	Male	Female	Male	Female	
1.	Himachal	48	35	21	20	69	55	2.02
		(69.57)	(63.64)	(30.43)	(36.36)	(55.65)	(44.35)	
2.	Uttrakhand	36	20	17	8	53	28	2.24
		(67.92)	(71.43)	(32.08)	(28.57)	(65.43)	(34.57)	
3.	Total	84	55	38	28	122	83	2.11
		(68.85)	(66.27)	(31.15)	(33.73)	(59.51)	(40.00)	

Figures in parentheses indicate percentage to total

But the state wise distribution of dependency ratio (Figure 5. 4 & 5.5) illustrates that the adult-child ratio was found to be 2.11 for the total samples. The dependency ratio was higher for Uttrakhand (2.24) than that of Himachal Pradesh(2.02).

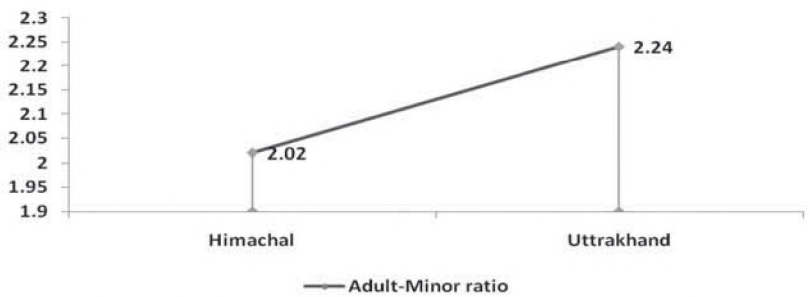


Figure: 5.4: Dependency ratio of the respondent households

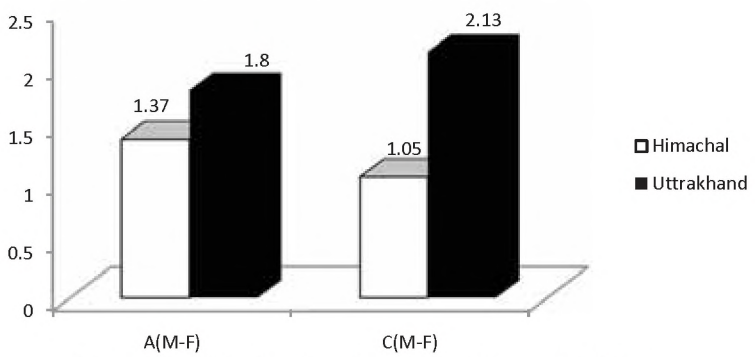


Figure 5.5: Male-Female ratio among adults and children

B. Literacy profile

(i) Literacy status

The literacy status includes the level of education as indicated by primary, secondary and collegiate. The primary level indicated schooling till fourth grade, secondary level indicated by high school, secondary and vocational education. The collegiate level of education was denoted by college and professional education.

The general literacy rate of India as a whole was 74.52 per cent (Census-2011) against the literacy rate of 75.81 per cent among the fisher folk (Table 5.6 & Figure 5.6). The results indicate that among the literates 37.67 per cent have primary level of education, 25.58 per cent have secondary level of education and remaining has collegiate level of education. Persons with collegiate education was more in Uttrakhand (25.25 per cent) and that with high school education was more in Himachal Pradesh (41.86 per cent). The state having maximum number of primary educated people was also found in Himachal Pradesh with 55.81 per cent.

Table 5.6: Literacy profile of the respondent families (Number)

State	State	Total	Illiterate	Literate	Literacy level		
					Primary	Secondary	Collegiate
1.	Himachal	116	30	86	48	36	2
			(25.86)	(74.14)	(55.81)	(41.86)	(2.33)
2.	Uttarakhand	99	22	77	33	19	25
			(22.22)	(77.78)	(33.33)	(19.19)	(25.25)
3.	Total	215	52	163	81	55	27
			(24.19)	(75.81)	(37.67)	(25.58)	(12.56)

Figures in parentheses indicate percentage to total

The state wise literacy rate of the respondents is represented in Figure 5.6. It shows that literacy rate of the respondents of Uttarakhand were marginally high at 77.78 per cent whereas for Himachal Pradesh it was recorded 74.14 per cent.

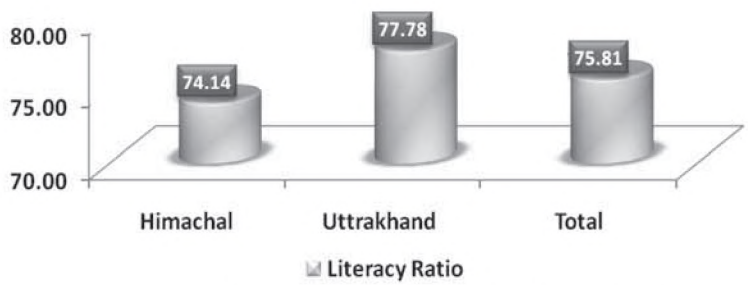


Figure 5.6: Literacy rate of the respondent's household

(ii) Educational profile

The information on education of the respondents in terms of continuance and discontinuance of education would provide the scope of employment, opportunities, possible migration, and alternative employment options of the sample households. Thus, continuing

and dropout ratios were calculated among the respondent households across the selected coldwater states. The continuing drop out ratio indicated the level of growing importance of education between the past and the present.

The dropouts were more at primary level of education with 38.26 per cent (Table 5.7 and Figure 5.7). It was higher in Himachal with 41.86 per cent and in Uttrakhand it was 33.33 per cent. The dropout at secondary level of education was about 19.46 per cent ranging from 24.42 per cent at Himachal Pradesh to 12.70 per cent at Uttrakhand. The dropout at collegiate level was found to be 4.70 per cent and it varied from 1.16 at Himachal Pradesh to 9.52 per cent at Uttrakhand.

It was found that the tendency to drop out education was more with primary education followed by secondary primary and least with collegiate education. This is on account of generating source of employment in fisheries related activities with secondary education as there was no other means of education and also due to following the traditional employment available. Collegiate education provided a source of alternate employment and another means of livelihood.

Table 5.7: Education of respondent households - Continuing and Dropout (Number)

Sl. No.	State	Continuing / Completed	Drop outs			Total
			Primary	Secondary	Collegiate	
1.	Himachal	28	36	21	1	86
		(32.56)	(41.86)	(24.42)	(1.16)	(100.00)
2.	Uttrakhand	28	21.00	8.00	6.00	63.00
		(44.44)	(33.33)	(12.70)	(9.52)	(100.00)
3.	Total	56	57	29	7	149
		(37.58)	(38.26)	(19.46)	(4.70)	(100.00)

Figures in parentheses indicate percentage to total

The improved ratio measures the increasing level of awareness of education among the households. It was found that the continuing-dropout ratio was the highest for Uttrakhand recorded at 0.80 per cent whereas, Himachal Pradesh recorded at 0.48 per cent. The results indicated that there exist increased enrolments in the present generation when compared to the past. But the possibility of seeking employment can be the reasons for the increasing dropouts among the sampled states.

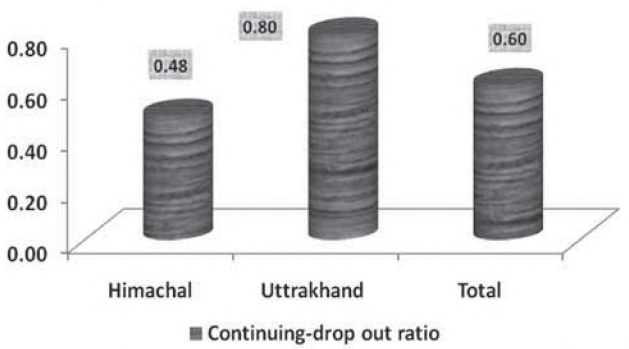


Figure 5. 7: Continuing Dropouts ratio among respondent households

(iii) Access to educational institutions

Access to education is an important yardstick to measure the socio-economic well being of a society. The proximity of the educational institutions like primary school, high school, college, and professional college provides a major impetus when it comes to continuing education. That was something the fisherfolk were said to be denied earlier which was disproved by the findings of the study.

The access to education was analyzed by finding the distance to nearby educational institutions. The average distance from fishing villages to nearly primary, high school, college and professional institution are given in Table 5.8. As a whole the average distance to a primary school is 1.38 km, high school 3.22 km, college 21.04 km, and professional institution 27.79 km from fishing villages in India. The distance for primary schools ranges from 1.24 km in Himachal Pradesh to 1.52 km in Uttrakhand. The average distance to high school ranges from 2.45 km in Himachal Pradesh to 3.98 km in Uttrakhand. With regards to colleges average distance ranges from 12.6 km in Himachal Pradesh to 29.48 km in Uttrakhand. The average distance for professional institution ranges from15.5 km in Himachal Pradesh to 40.08 kms in Uttrakhand. The results very clearly indicate the reasons for growing literacy among the fisherfolk (Figure 5.8) and thus clearly states that the improved or increased access to educational facilities has helped to increase the literacy level of the fisherfolk. And in spite being longer distance of professional & higher school the fisherfolk are ready to continue their studies.

Table 5. 8: Access to Education (km)

Sl.No.	State	Primary school	High school	College	Professional college
1.	Himachal	1.24	2.45	12.6	15.5
2.	Uttrakhand	1.52	3.98	29.48	40.08
3.	Average	1.38	3.22	21.04	27.79

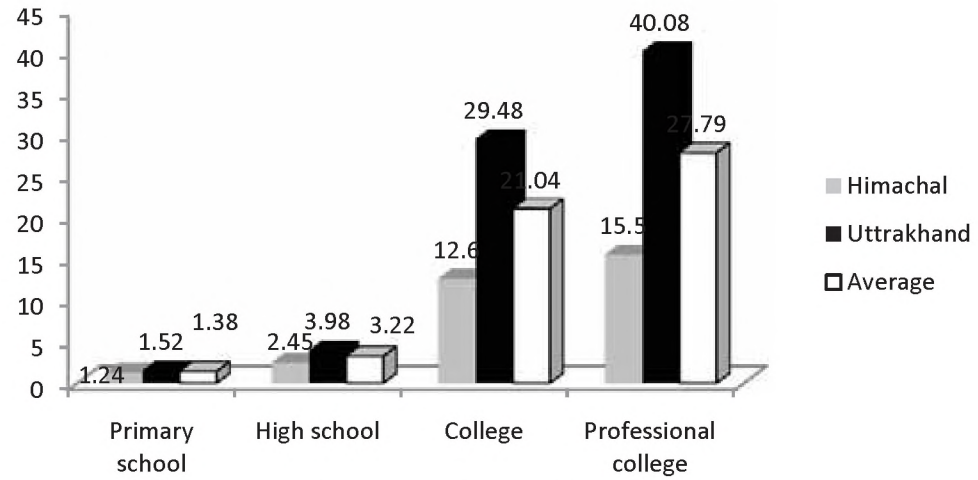


Figure. 5.8: Access to educational institutions (in km)

C. Health status of respondent households

The average life expectancy of people in the country is worked out to be at 65.5 years ranging from 62.8 years for male to 68.2 years for female. The health status of the respondent households was studied based on the parameters like administration of vaccines, incidence of discontinuation, birth weight of infants, incidence of maternal and child mortality at the time of birth, incidence of common diseases and special ailments among adults and children. Disease management aspects like access to health care, problems in health management and suggestions to improve the health care facilities are also dealt in this session.

(i) Vaccination regime of infants / children (less than 15 years)

The average age of administration of vaccination and incidence of discontinuation among infants/children with age less than 15 years in the selected cold water fisheries states of India is furnished in Table 5. 9 & Figure 5. 9. The vaccination for Pox, BCG, MMR and Polio were taken by all the families covered under the study. The average age at which the vaccination for pox was given to the child is worked out to be 6.2 years ranging from 3.45 years at Himachal Pradesh to 8.9 years at Uttrakhand. The average age at which BCG administered was 0.69 years. The administration of BCG, MMR and other vaccination was not reported in Uttrakhand which reveals the inefficiency of health department to cover these areas.

Table 5.9: Vaccination regime of infants / children (less than 15 years)-
Average age of administration and incidence of discontinuation

Sl. No.	State	Pox		BCG		MMR		Polio		Others	
		Age (years)	IoD (per cent)	Age (years)	IoD (per cent)	Age (years)	IoD (per cent)	Age (years)	IoD (per cent)	Age (years)	IoD (per cent)
1.	Himachal	3.45	10.6	0.69	12.5	1.9	18.3	4.5	12.3	6.2	11.25
2.	Uttrakhand	8.9	24	-	100	-	100	6.8	68	-	100
3 .	Average	6.2	17.3	0.69	56.25	1.9	59.15	5.7	40.15	6.2	55.625

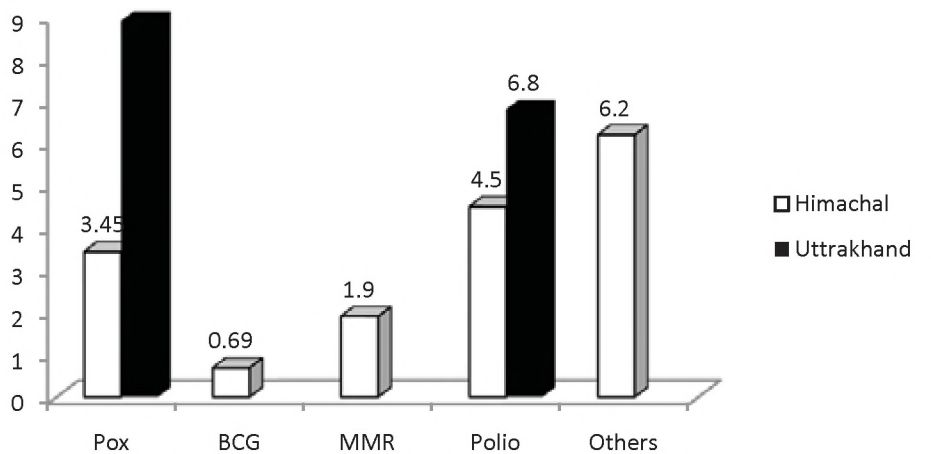


Figure: 5. 9. Average age of administration of vaccination

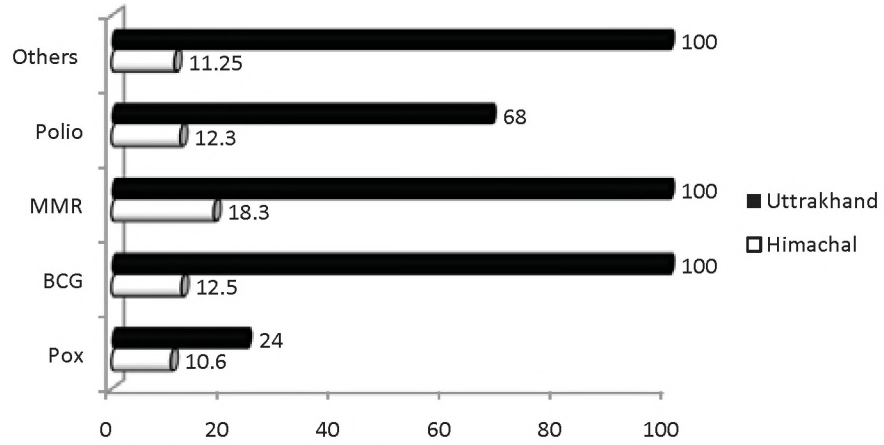


Figure 5.10: Incidence of discontinuation of vaccination in infants (1to 15 yrs)

Incidence of discontinuation was noticed in both states (Figure 5.10). The discontinuation of pox was reported 10.6 per cent in Himachal and 24 per cent in Uttrakhand. The discontinuation of MMR and polio was found to be 18.3 per cent and 12.3 per cent in Himachal Pradesh. These vaccinations were not found administered in the sampled respondent's households in Uttarakhand.

The reasons for the discontinuation vaccination regime of infants are given in Table 5.10 and Figure 5. 11. The lack of sufficient doses of vaccine at the locality, lack of awareness about the availability of vaccines, traditional beliefs and, lack of time to access the vaccination, and poor reliability on vaccines provided by government agencies were listed as the reasons for discontinuation of vaccination in the questionnaire.

Table 5.10: Vaccination regime of infants / children - Reason for the discontinuation (Frequency)

Sl. No.	Reasons	State		
		Himachal	Uttrakhand	Total
1.	Traditional beliefs	4 (19.05)	3 (12.00)	7 (15.22)
2.	Lack of awareness about the availability of vaccines	2 (9.52)	4 (16.00)	6 (13.04)
3.	No time to access the vaccination	5 (0.00)	0 (0.00)	5 (10.87)
4.	Lack of sufficient doses of vaccine at the locality	5 (23.81)	15 (60.00)	20 (43.48)
5.	Poor reliability on vaccines provided by government agencies	5 (23.81)	3 (12.00)	8 (17.39)
6.	Total	21 (100.00)	25 (100.00)	46 (100.00)

Figures in parentheses indicate percentage to total

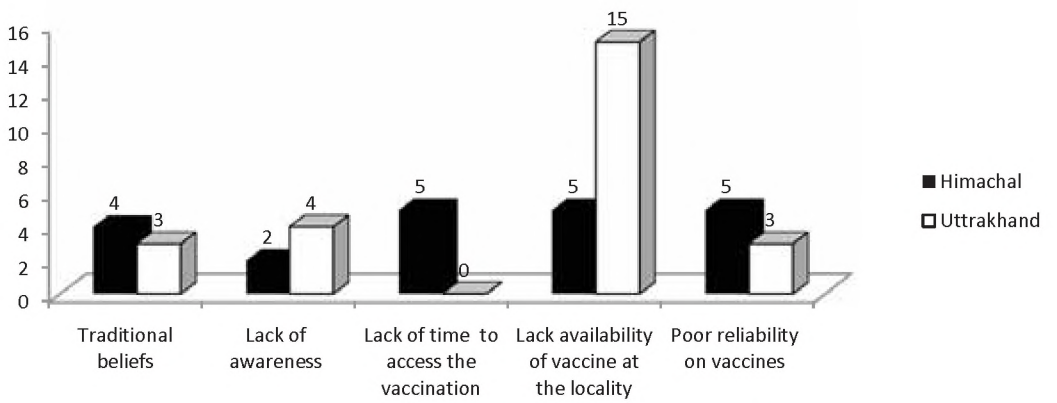


Figure 5.11: Reason for the discontinuation (Frequency)

(ii) Birth weight of infants

The birth weight of infants in fisher households at selected states is given in Table 5.11. The average birth weight of males was 2.76 kg and female was 2.66 kg. The average weight of male infants was recorded 3.01 in Himachal and 2.51 in Uttarakhand and female infants ranges from 2.85 kg in Himachal to 2.47 kg at Uttrakhand. This is in conformity with the average birth weight of a male and female child in India (Census-2001). The graphical representation of the birth weight of the male, female and all infants across the selected states is presented in Figure 5.12.

Table 5.11: Birth weight of infants (kg)

Sl. No.	State	Average Weight		
		Male	Female	Average
1.	Himachal	3.01	2.85	2.94
2.	Uttrakhand	2.51	2.47	2.49
3.	Average	2.76	2.66	2.72

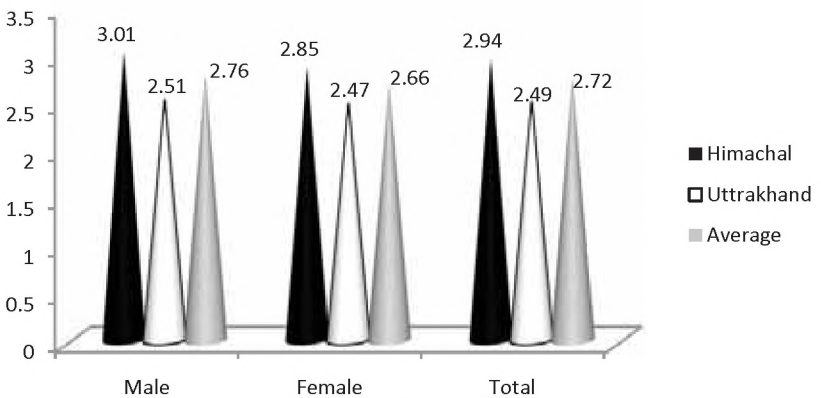


Figure 5. 12: Average Birth weight of infants across various states

(iii) Incidence of mortality among mother/child during birth

The results on the incidence of mortality among mother / child during birth are furnished in Table 5.12. Maternal and child mortality at the time of birth and infant mortality had been pressing concerns over the past. Generally in India, adequate care is being taken now to reduce the incidence of maternal and infant mortality. Out of the 51 delivery cases reported across the study period it was found that there were 2 cases of infant death. The maternal mortality was not reported in any case. But, infant mortality was reported in Himachal Pradesh with 2 case among 36 deliveries. The major reasons cited for the maternal death was due to immature foetal death, complication during delivery, etc.

Table 5.12: Incidence of mortality among mother/child during birth (Number)

Sl. No.	State	Total No. of child/ No of delivery	Mortality of mother/ child during birth				
			Mother	Reason	Child	Reason	Total
1.	Himachal	36	0	0	2	0	2 (5.56)
2.	Uttrakhand	15	0	0	0	0	0.00
3.	Average	51	0	0	2	0	2 (3.92)

Figures in parentheses indicate percentage to total

(iv) Incidence of diseases among adults

The incidence, frequency, and previous occurrence of diseases among the adult family members of the respondents across the selected coldwater states are discussed in the Table 5. 13 (A) and 5.13 (B).

Major diseases found among the respondents were categorized under two groups, viz; common diseases and special ailments. Fever/flu, body ache, diahorrea, gastro enteric disease, skin disorder, reproductive disorder are included in common diseases. Special ailments include diseases like cardiac failure, tuberculosis, anaemia, diabetics, blood pressure, AIDS and others.

In Himachal and Uttarakhand, the average annual frequency of fever was found to be 1.96 and 1.25 for males and 2.5 and 1.27 for females, respectively. Among the family members 41 males and 38 females were affected with fever in Himachal. The second most frequent disease found in the state was body ache followed by diahorrea. The occurrence of diahorrea and skin diseases can be due to the lack of hygienic conditions in the sampled areas. In Uttrakhand, the average annual frequency was recorded 1.25 and 1.27 among males and females respectively for flu/fever. Its incidence was in 24 males and 11 females. Only one case of gastroenteric disease was reported in male with annual frequency of 4 months.

Reported cases of special ailments found among the families of respondents were less across the Himachal and Uttrakhand states. It is quite interesting to note that the respondent households were not affected with life style diseases. There was not even a single member with special ailments or life style diseases like diabetics, blood pressure, and AIDS were seen among the respondent families in the cold water fisheries states of India.

The previous occurrence reported was highest for body ache in case of females of Himachal (3 months) and diahorrea among females of Uttarakhand (4 months.)

Table 5.13(A): Incidence of Diseases among the Adults: Annual frequency

SI. No.	Diseases	State				
		Himachal			Uttrakhand	
		Particular	Male	Female	Male	Female
	(i) Common diseases					
1.	Fever/Flu	Incidence	1.96	2.5	1.25	1.27
		Number	41	38	24	11
2.	Body aches	Incidence	1.25	2.3	Nil	Nil
		Number	35	34	Nil	Nil
3.	Diahorrea	Incidence	1.1	1.6	1.23	1.44
		Number	33	29	13	9
4.	Gastroenteric disease	Incidence	1.79	1.42	4	Nil
		Number	39	26	1	Nil
5.	Skin disorder	Incidence	0.52	0.69	1	Nil
		Number	25	20	1	Nil
6.	Reproductive disorder	Incidence	Nil	Nil	Nil	Nil
	(ii) Special ailments					
7.	Cardiac failure	Incidence	Nil	Nil		Nil
		Number	Nil	Nil		Nil
8.	TB	Incidence	Nil	Nil		Nil
		Number	Nil	Nil	1	Nil
9.	Anaemia	Incidence	Nil	Nil	2	Nil
10.	Diabetes	Number	Nil	Nil		Nil
		Incidence	Nil	Nil		Nil
11.	Blood pressure	Number	1	1		Nil
		Incidence	18	12		Nil
12.	AIDS	Number	Nil	Nil		Nil

Table 5.13 (B): Incidence of disease among adults: Previous occurrence

SI. No.	Diseases	State			
		Himachal		Uttrakhand	
		Male	Female	Male	Female
	(i) Common diseases				
1.	Fever/Flu	2.45	2.89	2.19	1.70
2.	Body aches	2.25	3.00	1.95	2.40
3.	Diahorrea	1.60	1.80	2.70	4.00
4.	Gastroenteric disease	0.56	0.50	2.25	Nil
5.	Skin disorder	1.50	0.75	8.00	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil
	(ii) Special ailments				
7.	Cardiac failure	Nil	Nil	Nil	Nil
8.	TB	Nil	Nil	6.00	Nil
9.	Anaemia	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil
11.	Blood pressure	1.50	2.00	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil
13.	Others* (Infertility)	Nil	Nil	Nil	Nil

(v) Incidence of diseases among children

Among children, the most frequently occurred disease is fever, body ache, diahorrea, gastroenteric disease and skin disorder (Table 5. 14 A & 5.14B). In Himachal Pradesh, the annual frequency of fever was reported at 2.5 in males and 2.12 in females. The incidence of body ache was seen 13 in male and 12 in female with an annual frequency of 2.8 and 2.01 respectively. The incidence of diahorrea was observed 10 in male and 11 in female at an annual frequency of 2.4 and 2 respectively.

In Uttrakhand, the incidence of fever flu, body ache and diahorrea was observed sparse. The annual frequency of body ache was 2.5 and 3.1 in male and female, respectively. The cases of diahorrera was highest among males at 3.6. No cases of special ailments were reported in Himachal Pradesh and Uttrakhand.

Table 5.14 (A): Incidence of disease among children: Annual Frequency

SI. No.	Diseases	State				
		Himachal		Uttrakhand		
		Particular	Male	Female	Male	Female
	(i) Common diseases					
1.	Fever/Flu	Incidence	2.50	2.12	2.20	1.94
		Number	12	10	10	13
2.	Body aches	Incidence	2.80	2.01	2.50	3.10
		Number	13	12	2	5
3.	Diahorrea	Incidence	2.40	2.00	3.60	2.68
		Number	11	10	14	8
4.	Gastroenteric disease	Incidence	1.80	1.40	Nil	Nil
		Number	10	9	Nil	Nil
5.	Skin disorder	Incidence	1.20	1.89	Nil	Nil
		Number	11	14	Nil	Nil
6.	Reproductive disorder	Incidence	Nil	Nil	Nil	Nil
	(ii) Special ailments					
7.	Cardiac failure	Incidence	Nil	Nil	Nil	Nil
8.	TB	Incidence	Nil	Nil	Nil	Nil
9.	Anaemia	Incidence	Nil	Nil	Nil	Nil
10.	Diabetes	Incidence	Nil	Nil	Nil	Nil
11.	Blood Pressure	Incidence	Nil	Nil	Nil	Nil
12.	AIDS	Incidence	Nil	Nil	Nil	Nil

Table 5.14 (B) Incidence of disease among children: Previous occurrence

SI. No.	Diseases	State			
		Himachal		Uttrakhand	
		Male	Female	Male	Female
	(i) Common diseases				
1.	Fever/Flu	2.11	1.28	3.25	2.95
2.	Body aches	1.25	1.24	2.60	2.40
3.	Diahorrea	1.53	2.15	1.40	1.65
4.	Gastroenteric disease	2.21	0.81	Nil	Nil
5.	Skin disorder	1.40	1.21	Nil	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil

(vi) Access to health care

The access to health care is also an important parameter which determines the continued health of the fisherfolk. Often the distance leads to the non treatment or its delay. The access to health care was measured using the distance required to avail the same (Table 5.15 and Figure 5.13) The results indicate that there exists considerable access to the primary health centre and hospital. On an average the primary health centre was available at a distance of 8.21 km and the hospital at 15.24 km. The average distances for the primary health centre is 7.25 km in Himachal Pradesh and 9.37 km in Uttarakhand and for hospital it is 14.52 km in Himachal Pradesh to 146km in Uttrakhand.

Table 5. 15: Access to health care (km)

S.No	State	Primary health centre	Hospital
1.	Himachal	7.25	16
2.	Uttrakhand	9.37	14.52
3.	Average	8.31	15.24

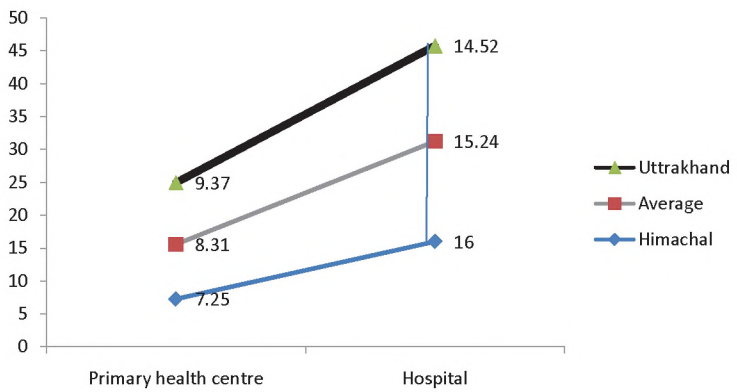


Figure 5.13 Access to Health care (km)

(vii) Problems in health management

The major problems underwent in health management was analyzed based on the opinion of the sample respondents. The major reasons cited by the respondents are indicated in Table 5.16 and Figure 5. 14. The state level analysis of the sample respondent households indicated that the non availability of ambulances & first aid facilities was the major problem perceived in Himachal Pradesh (20.31 per cent) & Uttrakhand (10.47 per cent). Availability of less number of doctors (specialists) and paramedics in the health care centres was cited by 14.06 per cent of people in Himachal and 11.63 per cent of people in Uttrakhand. Also, 17.44 per cent of people in Uttrakhand complained about the long distance of the health care facility. Over all the maximum responses were for non-availability of ambulance and first aid facilities (16.35 per cent) and availability of less number of doctors (specialists) and paramedics in the health care centres (15.89 per cent) in the selected coldwater states.

Table 5.16: Problems in health management (Frequency)

Sl. No.	Problems	State		
		Himachal	Uttra-khand	Total
1.	Non-availability of ambulance and first aid facilities	26 (20.31)	9 (10.47)	35 (16.35)
2.	Poor drinking water, sanitation, drainage, waste disposal and infrastructure in the village	18 (14.06)	10 (11.63)	28 (13.08)
3.	Availability of less number of doctors (specialists) and paramedics in the health care centres	18 (14.06)	16 (18.60)	34 (15.89)
4.	Doctors availability at fixed timings in the days	15 (11.72)	6 (6.98)	21 (9.81)
5.	Non- availability of medicines and/or less effective and costlier medicines in private medical shops	10 (7.81)	12 (13.95)	22 (10.28)
6.	Poor /less awareness of maternal and child care	16 (12.50)	8 (9.30)	24 (11.22)
7.	Lack of modern and bed facilities	15 (11.72)	10 (11.63)	25 (11.68)
8.	Long distance of the health care facility	10 (7.81)	15 (17.44)	25 (11.68)
9.	Total	128 (100.00)	86 (100.00)	214 (100.00)

Figures in parentheses indicate percentage to total

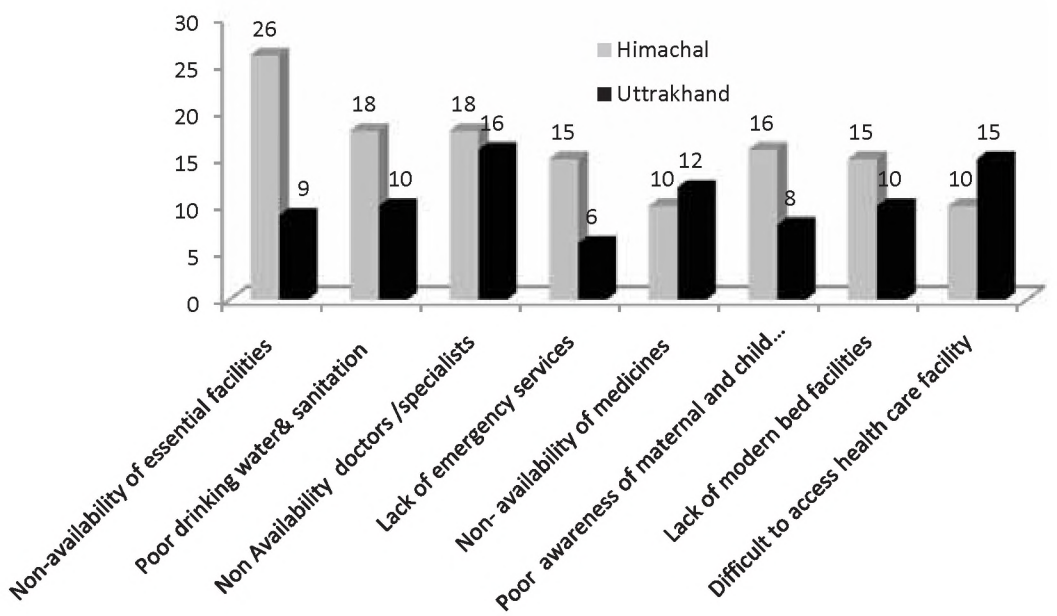


Figure :5. 14 Problems in health management (frequency)

(vii) Suggestions to improve healthcare facilities

The respondent households opined on the different suggestions for improving the health care facilities and the details are furnished in Table 5.17. The major suggestions cited by the respondents included increasing the number of doctors/specialists, construction of quarters facility for doctors so that they are available 24 x7, providing available sufficient medicines for all diseases with free of cost, construction of the modern hospital with all infrastructure and healthcare facilities, provision of ambulance for emergency (especially during delivery accidents, etc.) and providing good drinking water facility (Figure 5.15).

It was found that the most important suggestion which was opined by the respondent across the states was providing quarters facility for doctors so that they are available 24 x 7 (27.18 per cent in Himachal & 16.67 per cent in Uttrakhand.) followed by provisions for making sufficient medicines for targeted group (17.07 per cent), to construct the modern hospital with all infrastructure and health care facilities (15.12 per cent) and to have precautionary health awareness viz., accessing good drinking water, sanitation and waste disposal both at home and village (14.15 per cent)

Table 5.17: Suggestions to improve health care facilities (Frequency)

Sl. No.	Suggestions	State		
		Himachal	Uttra-khand	Total
1.	Make quarters facility for doctors so that they are available 24 x 7	28 (27.18)	17 (16.67)	45 (21.95)
2.	Make available sufficient medicines for targeted disease	15 (14.56)	20 (19.61)	35 (17.07)
3.	Make available of medicines with free of cost	14 (13.59)	10 (9.80)	24 (11.71)
4.	Construct the modern hospital with all infrastructure and health care facilities	12 (11.65)	19 (18.63)	31 (15.12)
5.	Provide ambulance for emergency (especially during delivery, accidents etc.)	8 (7.77)	12 (11.76)	20 (9.76)
6.	Increase the number of doctors / specialist	12 (11.65)	9 (8.82)	21 (10.24)
7.	Precautionary health awareness (Accessing good drinking water, sanitation and waste disposal - both home and village)	14 (13.59)	15 (14.71)	29 (14.15)
8.	Total	103 (100.00	102 (100.00	205 100

Figures in parentheses indicate percentage to total

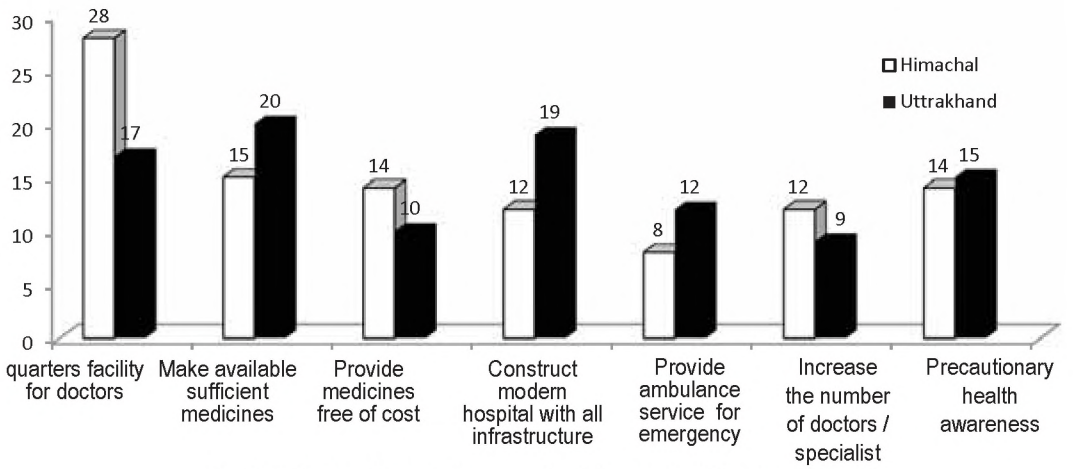


Fig 5.15: Suggestions to improve health care facilities (Frequency)

D. Income status of respondent households

The income profiling of the respondent households were analyzed using income patterns, respondents involvement in non fisheries activities and expenditure pattern. In addition the indebtedness and savings were analyzed using details on savings, indebtedness, sources of lending organization, purpose of availing loan and suggestions for enhancing the income and employment generation.

(i) Monthly income pattern of respondent households

The major income sources of the respondent households comprised of income from fishery, business, agriculture, labour services, and other service sectors. The highest monthly average income generated by the total respondents across the states was through fisheries sector. The state wise monthly income status of the respondents indicated in Table 5.18. It shows that Uttrakhand has the highest income from fisheries sector which contributed to 52.40 per cent of the total income.

In Himachal, the income from fisheries sector contributed to 42.57 per cent of the income followed by the labour sector contribution at 23.16 per cent. Also the total income was higher in Uttrakhand (Rs. 4958) as compared to Himachal Pradesh (Rs. 3277)

Table 5.18: Income profile of the respondents (Monthly Rs.)

Sl. No.	State	State					
		Fishery	Labour	Agriculture	Business	Other	Total
1.	Himachal	1395	759	425	440	258	3277
		(42.57)	(23.16)	(12.97)	(13.43)	(7.87)	(100.00)
2.	Uttrakhand	2598	1020	1200	70	70	4958
		(52.40)	(20.57)	(24.20)	(1.41)	(1.41)	(100.00)
3.	Average	1996.50	889.50	812.50	255.00	164.00	4117.50
		(48.49)	(21.60)	(19.73)	(6.19)	(3.98)	(100.00)

(ii) Involvement in non fisheries activities

The Involvement of respondent' households in non fisheries activities are illustrated in the Table 5.19 and Figure 5.16.

The major non fishing activities involved by respondents were labour, agriculture, business, and other service sectors with a contribution of 41.79, 38.81, 8.96 and 10.45 per cent respectively. The total number of respondents involved in labour was highest in Uttrakhand with 42.86 per cent. In Himachal Pradesh, 40.00 per cent of the respondents involved in labour activities which might be due to non availability of land in the state. The result clearly indicated the existence and practice of alternative avocation in the selected respondent households.

Table 5.19 Respondents involvement in non-fisheries activities (Number)

Sl. No.	State	State				
		Labour	Agriculture	Business	Any others	Total
1.	Himachal	10 (40.00)	5 (20.00)	4 (16.00)	6 (24.00)	25 (100.00)
2.	Uttrakhand	18 (42.86)	21 (50.00)	2 (4.76)	1 (2.38)	42 (100.00)
3.	Total	28 (41.79)	26 (38.81)	6 (8.96)	7 (10.45)	67 (100.00)

Figures in parentheses indicate percentage to total

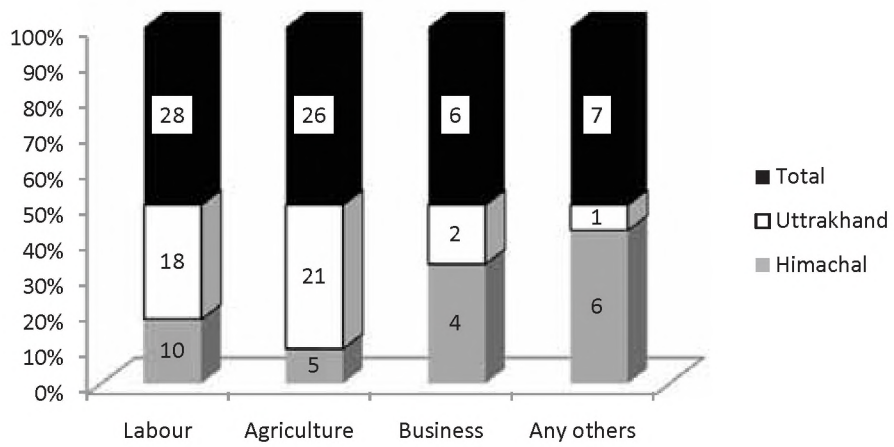


Figure: 5.16 Respondents involvement in non-fisheries activities (frequency)

(iii) Pattern of expenditure

The major household expenses measured include expenditure on food, clothing, fuel, medical, education, entertainment, personals and durables. The pattern of monthly expenditure of respondent household is represented in Table 5.20 and Fig 5.17. The average monthly expenditure pattern of the households worked out at Rs. 3469.00, comprises of Rs 886.00 on food, Rs 732.5 on education, Rs 454.5 on cloth, and Rs 413.50 on medical. The least

expenditure was Rs.107.00 on entertainment. The highest household expenditure was noticed in Uttrakhand with an average amount of Rs. 4425.00. Here people spend more money on education (25.76 per cent) than food (18.76 per cent).

In Himachal Pradesh fisher folks spent more on food with an average amount of Rs. 942 (37.49 per cent) and least is spend on entertainment (4.93 per cent).

Table 5.20: Pattern of expenditure of the fisher family (Monthly)

Sl. No.	State	Expenditure on Items								
		Food	Cloth-ing	Fuel	Medical	Edu-ca-tion	Enter-tain-ment	Per-sonal	Dura-bles	Total
1.	Himachal	942	289	64	242	325	124	246	281	2513
		(37.49)	(11.50)	(2.55)	(9.63)	(12.93)	(4.93)	(9.79)	(11.18)	(100.00)
2.	Uttrakhand	830	620	470	585	1140	90	680	10	4425.00
		(18.76)	(14.01)	(10.62)	(13.22)	(25.76)	(2.03)	(15.37)	(0.23)	(100.00)
3.	Average	886.00	454.50	267.00	413.50	732.50	107.00	463.00	145.50	3469.00
		(25.54)	(13.10)	(7.70)	(11.92)	(21.12)	(3.08)	(13.35)	(4.19)	(100.00)

Figures in parentheses indicate percentage to total

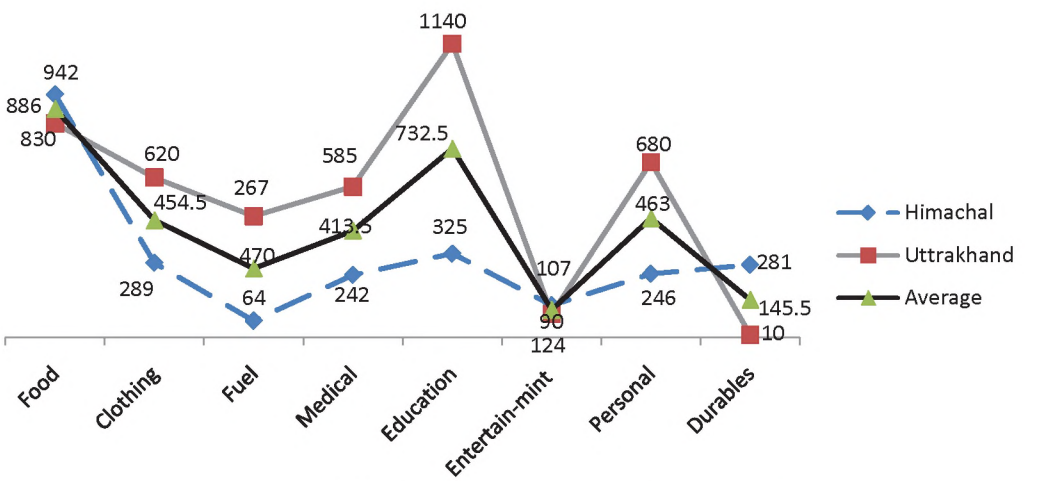


Figure 5.17: Pattern of expenditure of the fisher family

(iv) Indebtedness and Savings

The indebtedness and savings of the respondent households are indicated in Table 5.21. The saving details of the respondent's households across the states indicated that around 44 per cent of the respondents have no savings. It was found that the frequency of respondents possessing savings varied across the states with 16 per cent in Himachal Pradesh and 96 per cent in Uttrakhand. No respondents in the sampled population have a saving of more than Rs 50000.

Table 5.21: Savings details of respondent households

Sl. No.	State	Number of respondents having savings				Total
		Nil	< 50,000	50,000-1,00,000	>1,00,000	
1.	Himachal	21	4	0	0	25
		(84.00)	(16.00)	(0.00)	(0.00)	(100.00)
2.	Uttrakhand	1	24	0	0	25
		(4.00)	(96.00)	(0.00)	(0.00)	(100.00)
3.	Total	22	28	0	0	50
		(44.00)	(56.00)	(0.00)	(0.00)	(100.00)

Figures in parentheses indicate percentage to total

(v) Indebtedness of the respondents' households

The lack of savings and the need for increased expenditure for mere sustenance often lead to indebtedness. The pattern of indebtedness of respondent households across the 2 states of cold water fisheries in India is discussed in Table 5.22. The highest average amount of indebtedness was recorded in Himachal Pradesh with Rs. 35946 per person. The average amount repaid was Rs. 14269 accounted for 39.70 per cent of the loan amount. In Uttrakhand none of the person was in indebtedness.

Table 5.22. Indebtedness of the sample respondents

Sl. No.	State	Indebtedness			
		Number of persons Borrowed	Average Amount per person (Rs)	Average Amount repaid (Rs)	Per cent repayment
1.	Himachal	15	35946	14269	39.70
2.	Uttrakhand	Nil	Nil	Nil	Nil

(vi) Sources of lending

The indebtedness often results in availing loans from the different institutions. The major sources of lending include banks, co-operatives, private money lenders, friends/relatives and jewel loans. The details of the sources of money lending by the respondent households is furnished in Table 5. 23. It was found that nobody from Uttrakhand was in indebtedness, where as in Himachal Pradesh, a total of 15 respondents had availed loans for various purposes. It was found that private money lenders constituted the major source of lending organizations for 53.33 per cent of the respondent household. Banks provided credit to 2 respondents and constituted 13.33 per cent of the sample respondents. Cooperatives were a good source of lending through which 33.33 per cent of the respondents availed loan.

(vii) Purpose of availing loans

The respondents of the Himachal Pradesh availed loans for both fishing and personal purposes. The maximum share of (53.33 per cent) the respondents availed loans for fisheries, followed by consumption purpose ie. food, health, education and marriage (26.67 per cent)

Table 5.23: Sources of lending (Number of respondents who had availed)

Sl. No.	Sources	State	
		Himachal	Uttrakhand
1.	Banks	2 (13.33)	Nil
2.	Co-operative	5 (33.33)	Nil
3.	Private money lenders	8 (53.33)	Nil
4.	Friends / Relatives	0 (0.00)	Nil
5.	Jewel loans	0 (0.00)	Nil
6.	Total	15 (100.00)	Nil

Figures in parentheses indicate percentage to total

(Table 5. 24). 13.33 per cent of the respondents availed loan for purchasing land/house and another 6.67 per cent were availed loan for agriculture.

Table. 5.24. Purpose of availing loans (Number)

S. No.	Activity	State	
		Himachal	Uttrakhand
1.	Agriculture	1 (6.67)	Nil
2.	Fisheries	8 (53.33)	Nil
3.	Purchasing land/house	2 (13.33)	Nil
4.	Consumption Food, health, Education and Marriage)	4 (26.67)	Nil
5.	Total	15 (100.00)	Nil

Figures in parentheses indicate percentage to total

(viii) Suggestions for enhancing the income and employment generation by fishermen

Arranging institutional credit through micro finance and SHGs should be given priority according to 27.40 per cent of fishers (Table 5.25 & Figure 5.18).Other major options suggested include providing vocational training for fisher women to undertake house hold income activities during dry/off season (19.18 per cent), arrange water source/ground water facilities for conducting the fisheries around the year (17.81 per cent), regulation of fish marketing through institutional interventions (12.33), and provision of rural infrastructure for general societal/human development (9.59 per cent).

Table. 5.25. Suggestions for enhancing the income and employment generation by fishermen (percentage response)

Sl. No.	Suggestions	State		Total
		Himachal	Uttrakhand	
1.	Arranging the institutional financial support like micro credit for fisheries, SHGs etc.	8	12	20
		(25.81)	(28.57)	(27.40)
2.	Vocational training for fisher women to undertake household income activities during dry/off-season	6	8	14
		(19.35)	(19.05)	(19.18)
3.	Arrange the water source/ground water for conducting the fisheries around the year	4	9	13
		(12.90)	(21.43)	(17.81)
4.	Provision of rural infrastructure for general societal/ human development	2	5	7
		(6.45)	(11.90)	(9.59)
5.	Regulation of fish marketing through institutional interventions	5	4	9
		(16.13)	(9.52)	(12.33)
6.	Regulation of PDS and supply of the basic food items and fuel (like kerosene, LPG etc.) by the Govt. agencies	4	3	7
		(12.90)	(7.14)	(9.59)
7.	Provide the home construction materials by government through subsidized price	2	1	3
		-	(2.38)	(4.11)
8.	Total	31	42	73
		(100.00)	(100.00)	100.00)

Figures in parentheses indicate percentage to total

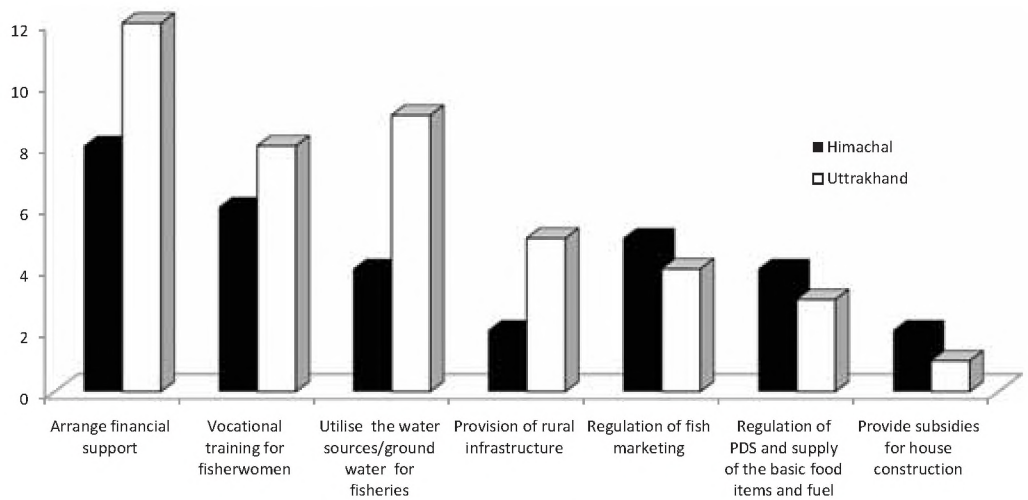
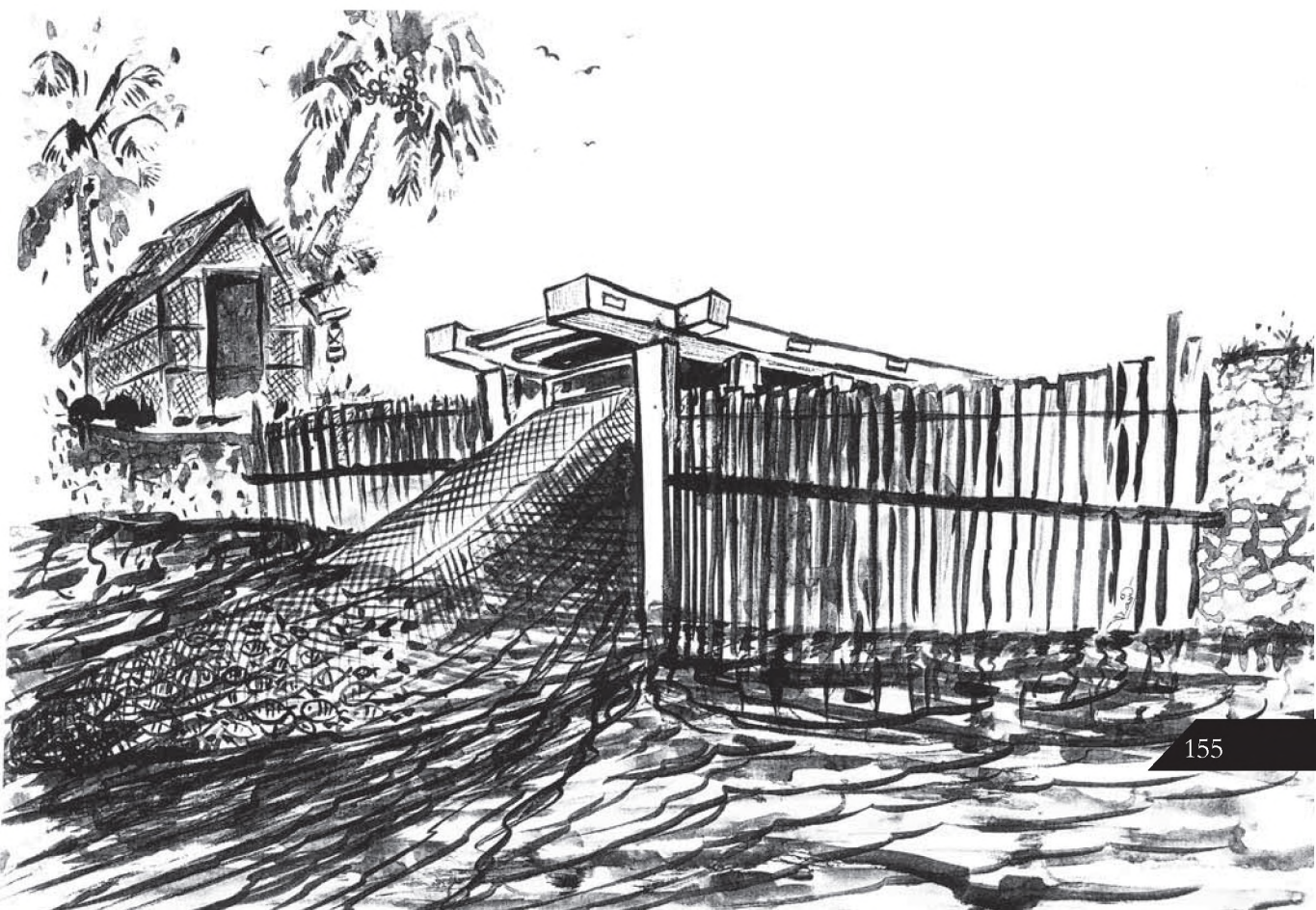


Figure 5.18 : Suggestions for enhancing the income and employment generation

Freshwater Aquaculture 06



06

Freshwater Aquaculture

Nagesh Kumar Barik, Rakesh Kumar, R.Narayanakumar,
M.Krishnan, Pradeep Katiha, K.Ponnusamy and Shyam.S.Salim

Settings

Indian aquaculture has grown at a faster pace of almost 5.5 per cent per year consistently since last 50 years. In some of the years the growth rate in the aquaculture was recorded as high as 9 per cent. Indian aquaculture has demonstrated a six and half fold growth over the last two decades, with fresh water aquaculture contributing over 95 per cent of the total aquaculture production and more than half of the national fish production. The three Indian major carps, namely catla (*Catla catla*), rohu (*Labeo rohita*) and mrigal (*Cirrhinus mrigala*) contribute the bulk of production with over 1.8 million tonnes (FAO, 2003) Average national production from fresh water ponds has increased from 0.6 tonnes/ha/year in 1974 to 2.9 tonnes/ha/year by 2009–2010 (DAHDF, 2010), with several farmers even demonstrating production levels as high as 8–12 tonnes/ha/year. For the newly introduced fishes like Pangus the production recorded was as high as 25 tonnes/ha/yr. At the national level as well as in state level, the production and productivity has been on the rise over a period of time. Backed by new policies like Fish Farmers Development Agencies (FFDA), National Fisheries Development Board (NFDB) and state initiatives, there are enough incentives to increase the productivity of fish per unit water areas.

Traditionally aquaculture has been mostly limited to the stocking of the mixed natural seed in the natural impoundments of small water bodies in eastern India. The practice of collecting natural seeds was highly uncertain and risky, yielding very low level of the production. In the past the availability as well as consumption was confined to a large extent with the availability of the fishes from the inland as well as coastal areas. But, with the increased preference for the fish as delicacy and nutritive food the demand for fish has been on rise and the Indian Aquaculture Research System responded to it by generating technology relevant to the resource and time. Over a period of time since seventies, many technologies were being produced by the research system and among them two technologies i.e. induced breeding and composite fish culture, these two basic technologies for seed production and fish husbandry needs special

mention. Both of these technologies and many adaptations there of were able to revolutionize the freshwater aquaculture sector of the country.

Aquaculture in India can be divided into low, moderate and high input based production system with the average productivity of 2 t, 5 t and 8 t per ha per year respectively. At present we are utilizing about half of the available 2.36 million ha water bodies available in the form of the ponds and tanks. These figures are highly underestimated owing to large number of other types of the water bodies being used for the aquaculture as well as large number of the water bodies being carved out on almost daily basis. In addition, the traditional community and multi stakeholder water bodies like small irrigation structure, water harvesting structures, wetlands etc are being put under aquaculture practices.

In India, there is enough scopes for the horizontal as well as vertical expansion of the aquaculture as the average aquaculture production can be increased from 3 to 6 t per ha and total area can be increased from 1.2 million ha to 2.5 million ha. Therefore, the aquaculture provides a considerable opportunity for increasing income and employment to a large number of people. Considering the substantial contribution, aquaculture makes socio-economic development in terms of income and employment through the use of unutilized and under utilized resources in several regions of the country. Environment friendly aquaculture has been accepted as a vehicle for rural development, food and nutritional security for the rural masses. It also has immense potential as a foreign exchange earner. Greater R&D support with strong linkages between research and development agencies, increased investment in fish and prawn hatcheries, establishment of aquaculture estates, feed mills and ancillary industries have all been identified as important areas for maintaining the pace of growth of the sector (FAO, 2011). The implication of aquaculture on the income, employment and livelihoods is context specific, as the level of adoption of the technology, investment and methods greatly determine income and employment. Extensive aquaculture is carried out in comparatively large water bodies with stocking of the fish seed as the only input for utilizing natural productivity produces employment mostly in harvesting, where as in the water bodies many inputs were used. In the intensive system, the employment is generated in input production, input supply, aquaculture management, harvesting and marketing. Therefore, with the increase in the productivity and investment the income and employment generating capacity increases substantially.

Although aquaculture in India has reached the status of an industry, a database with details of human resources in aquaculture and allied sectors is lacking due to the dispersed nature of aquaculture resources and non-availability of a suitable mechanism for data collection. In a study conducted in six major aquaculture producing Indian states (Andhra Pradesh, Haryana, Karnataka, Orissa, Uttar Pradesh and West Bengal), Bhatta (2003) the reported the age of fish farmers ranged from 38 years in Andhra Pradesh to 58 years in Haryana with a national average of 47 years. The educational status of these fish farmers varied from 0–10 years of schooling, a large percentage of these fish farmers practice aquaculture on a part time basis with their involvement in the activity ranging from 17 man-days per annum in Karnataka to the highest of 75 man-days in West Bengal. This study also inferred that fish farming, though a part time activity, contributes to a major share of income of these fish farmers, ranging from 14.98 per cent in Orissa to 95.26 per cent in Andhra Pradesh, with an average of 79.66 per cent (FAO, 2011). This study in no way is a comprehensive assessment of the socioeconomic status

of the fish farmers in India. The structure of the industry and human resource dynamically varies along spatial and temporal dimensions.

The aquaculture operations are more keen to agriculture than other fisheries activities. A large number of the small scale farming of aquaculture operate in a small portion of the agricultural land. Small scale operators operate at about 1-2 ha where as medium scale operations is between 2 to 5 ha of water areas. But in the Kolleru lake areas of the Andhra Pradesh the pond size of 25 to 50 ha is common. At the smaller level the aquaculture is only a household activity for utilization of the farm by products and limited amount of the inputs. But the medium level operators were for the local markets and the large scale intensive operators operates in the high production, high volume and commercial basis.

While carp form the most important species farmed in freshwater in India, it is the shrimp from the brackish water sector which contributes the bulk of the production. The three Indian major carps, namely, catla (*Catla catla*), rohu (*Labeo rohita*) and mrigal (*Cirrhinus mrigala*) contribute as much as 87 per cent of the total Indian aquaculture production. Introduced during the 1970s into the carp polyculture systems in the country, three exotic carps namely, silver carp (*Hypophthalmichthys molitrix*); grass carp (*Ctenopharyngodon idellus*) and common carp (*Cyprinus carpio*) now form a second important group, together constituting as much as 0.169 million tonnes (2002). In spite of the fact that the country also possesses several other cultivable medium and minor carp species which show high regional demand, including, *Labeo calbasu, L. fimbriatus, L. gonius, L. bata, L. ariza, Cirrhinus mrigala, Puntiuss arana, Hypselobarbus pulchellus, H. kolu*s and *Amblypharyngodon mola* as well as several others, commercial farming of these species has been almost non-existent (Ayyappan and Jena, 2003).

The present study of the assessment of literacy, income and health status of the fish farmers of India is the first of its kind in which a large sample of the households were studied across six states i.e. Assam, West Bengal, Orissa, Andhra Pradesh, Punjab and Tamil Nadu representing major states, region and types of aquaculture system in India. It presents aquaculturists as diverse group with diverse family welfare performance. Therefore, the comprehensive assessment of the socio-economic status of the aquaculture will give a new insight into the important aspect.

Sampling and data collection

The fresh water aquaculturists consist of a diverse group of farmers from very small backyard fish culturist to large commercial operators. At one end, the aquaculture is small scale household activity and subsistence in nature while at the other it is a large scale corporate farming providing fish to the urban centres of the country. The variability in size, scale, integration, region, location etc makes fish farmers a highly diverse group. Among them, the regional variability is the most important one as types of resources, nature of farming and socio-cultural milieu is region specific. The developmental policies are under the jurisdiction of the state government. Therefore, state is an important unit in characterizing fish farmers in India. In the study, samples were drawn from Orissa, West Bengal, Assam as eastern and northeastern states; Andhra Pradesh and Tamil Nadu as south Indian states, and Punjab as north west state. In each state, the selected districts were sampled to make a fair representation

of the region. A total of 502 samples were collected across six states. The details of the samples are presented in the Table 6.1.

Table 6.1: Sampling distribution of fish farmers of India

Sl. No.	State	District	Samples
1.	Orissa	Cuttack	16
		Khurda	21
		Boudh	13
		Anugul	10
		Sonepur	19
		Puri	22
		Total	101
2.	Punjab	Ludhiana	29
		Fatehgarhsahib	7
		Patiala	13
		Total	49
3.	West Bengal	24 paragana (N)	100
4.	Assam	Nagaon	32
		Barpeta	45
		Morigaon	21
		Kamrup	2
		Total	100
5.	Tamil Nadu	Tanjevur	36
		Tirunelveli	30
		Changelpettu	36
		Total	102
6.	Andhra Pradesh	Krishna	50
7.	Grand Total		502

Orissa is an important state for the freshwater aquaculture in the country. It is among the few states with all types of the fisheries resources like fresh water/inland capture and culture, marine capture and culture and brackish water marine and culture. Among them, the fresh water aquaculture is important from the domestic consumption point of view. The sectors are dominated by ponds and tanks. There are eight agro climatic zones in Orissa but primarily the state can be divided into coastal and interior regions. The coastal regions are plain lands where as the interior areas were mostly plateau or hilly regions. Therefore, in the present project two sets of the samples were made from the coastal and interior regions. In the coastal regions, the districts of Cuttack, Khurda, Puri were chosen where as for interior region the districts of Boudh, Anugul, and Sonepur were selected for sampling in the project. A total of 101 samples were collected out of which 59 were from the coastal and 42 were from the interior districts.

Andhra Pradesh, an east-coastal state in southern India leads the country in carp culture, shrimp culture and also scampi culture. Andhra Pradesh ranks first in coastal aquaculture and fresh water aquaculture. It ranks second in fresh water fish production and overall value of fish/prawn production. Andhra Pradesh contributes nearly 40 per cent of the total marine exports of the country. Inland resources comprise 102 reservoirs of which 7 are large, 26 are medium and 69 are small reservoirs. Indian major carp culture in earthen dug-out ponds represents the first phase of aquaculture in the state which has sustained for more than quarter of a century. Because of rapid expansion and intensification, by 2010, the carp culture area increased to about one lakh ha. Almost 98 per cent of the carp culture in the state developed in and around the largest fresh water lake in India, the Kolleru, which extends between the Krishna and Godavari districts and is now recognized as the fish bowl of India. This region together can be regarded as Krishna-Godavari delta (KG). The samples were drawn mostly from Krishna district of KG delta.

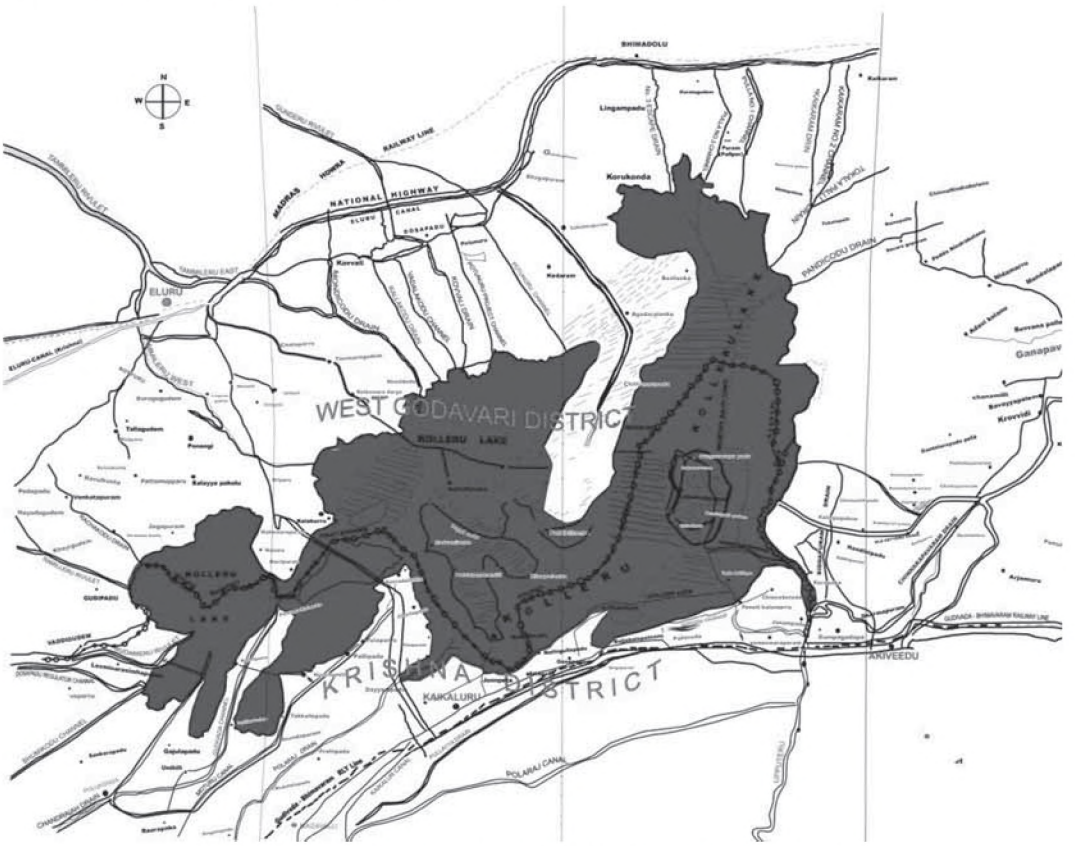


Fig 6.1: Map of Kolleru region, West Godavari/ Krishna districts

This semi-intensive carp culture system, popularly called as Kolleru carp culture, has a production range of 7.5 – 12.5 metric tones/ha/year and an annual state production of 600,000 metric tonnes, achieved by growing basically two species *Labeo rohita* (rohu), and *Catla catla* (catla), at the ratio of 80 - 90 : 10 – 20, with a rare addition of *C. mrigala* (mrigal), in heavily fed and fertilized still water ponds, supporting thousands of farmers and hundreds of people in allied industries and services. The system has become a unique model of carp culture, not

only for the rest of the India, but also for other Asian countries, for example, Bangladesh and Myanmar. More specifically, for the past 15 years, the Kolleru carp culture has become a Mecca, attracting carp farmers, scientists, fishery-policy makers and administrators from other Indian states and also those from several foreign countries who are interested in understanding the unique features of the system.

Mudinepalli, Bantumalli, Mudivepalli, Kalidindi mandals were among the 50 mandals in Krishna district which were purposively selected for selection of 50 freshwater aquaculture farmers as considerable activity in this sector was observed in these places.

West Bengal is the foremost and historically most important state in the aquaculture development in the country. Before development of the modern ways of the fish culture, the traditional methods of 'trapping and holding' system were in practice for centuries. It is no surprise, that the research and development of aquaculture was initiated in West Bengal. The state received greatest attention in the development of aquaculture and it is a popular and household enterprise. To assess the social status of the aquaculture 100 farmers were sampled.

Assam is a very important eastern Indian state from aquaculture point of view. The state has abundant freshwater resources in terms of the river, wetlands and ponds. The demand for the fish is very high as almost every one is a fish eater and in the recent times, the freshwater aquaculture has been developed quite remarkably. About 100 farmers across three districts were being sampled under the project to assess the socio-economic condition.

In addition to these traditional states, Tamil Nadu and Punjab has been selected as two emerging areas in freshwater aquaculture. Large scale commercial farms are being operated in Punjab where as small and medium farmers have taken up freshwater aquaculture in Tamil Nadu. A total of 50 and 100 samples were collected from Punjab and TN, respectively.

1. General characteristics

The general characteristics of the fish farmers were measured in terms of age distribution, family size, composition etc. as a measure of demography and household characteristics.

(i) Age distribution

The age distribution of respondent households is given in Table 6.1. The freshwater aquaculture sector of Orissa was predominantly operated by the middle age group within the range of 36 to 55 years as about 58 per cent of the aquaculturist belongs to these groups. This trend is more prominent in the coastal districts like Cuttack and Puri which were having a tradition of aquaculture. Whereas the respondents of Boudh and Sonepur districts represent younger group of people (i.e. about 70 per cent and 58 per cent respectively). About 18 per cent of the people with age more than 56 years were reported to be in aquaculture.

The age wise composition of AP shows that the farmers were predominantly from the middle aged group. Of the 50 farmers sampled, 70 per cent of the farmers were middle aged between the ages of 36-55. Only 26 per cent were in the senior age category of above 56 years and 4 per cent were in the youth group of less than 35 years of age in AP. But, the trend of West Bengal is different as about 60 per cent of respondents belonged to age group of less

than 35 and 26 per cent of the people within age group of 36 to 55 years. Therefore, it can be concluded that the farmers of WB were relatively younger compared to other states.

Table 6.2 Age wise details of sample respondent (Years)

Sl. No.	District	<35	36-55	>56	Total
1.	Orissa	24	59	18	101
		(23.80)	(58.40)	17.80)	(100.00)
2.	West Bengal	60	26	14	100
		(60.0)	(26.00)	(14.00)	(100.00)
3.	AP	2	35	13	50
		(4.00)	(70.00)	(26.00)	(100.00)

Figures in parentheses indicate percentage to total

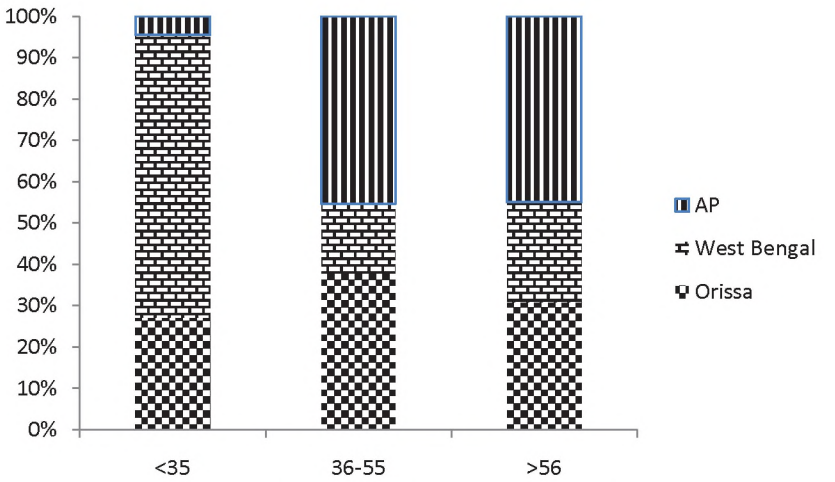


Fig 6.2: Age wise details of sample respondent

(ii) Male - female ratio and child-adult ratio

Male-Female Ratio (sex ratio) is an important social indicator to measure the extent of equity prevailing between males and females at a given point of time. It is mainly the outcome of the interplay of sex differentials in mortality, sex selective migration, sex ratio at birth and the sex differential in population at times. The sex-ratio is measured in terms of the number of females per thousand male. In natural population the female ratio is marginally higher than 1000 and ratio of 1000 is considered as ideal. But in the sampled population the ratio was found to be 805 which is quite low in any standard. In Assam and Bengal it was even low in the range of 725. Therefore, it can be emphasized that the gender disparity is quite wide spread among the fish farmers in general. Such disparity is reflected in intra-household access to resources, food, education and other provision. Contrary to other states, the state of AP has shown exceptionally higher number of female compared to male. The most educated and higher income group of the people were involved in the fish culture in the state. The higher ratio confirms greater gender equality in AP compared to other states.

The child-adult ratio is an important demographic characteristic in the population. The higher child ratio indicates higher dependency and also the availability workforce in the near future. The child ratio was found to be higher in Assam (48.2 per cent) and low in Punjab (18.9 per cent) with a sample average of 27.0 per cent.

Table 6.3: Sex ratio among the fish farmers of India

Sl.No	Orissa	Orissa	West Bengal	Assam	Tamil Nadu	Punjab	Total
1.	Female: male ratio (per 1000)	829.3	722.9	728.2	841.8	777.8	805.3
2.	Child: adult ratio (per 100)	21.8	29.4	48.2	29.4	18.9	27.0

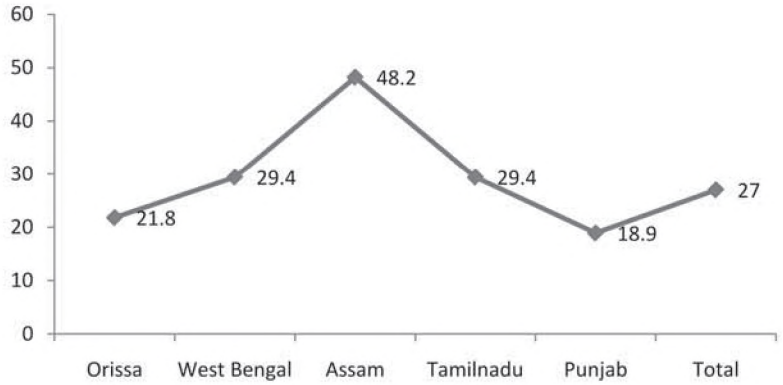


Fig 6.3: Child Adult ratio of fish farmers in India

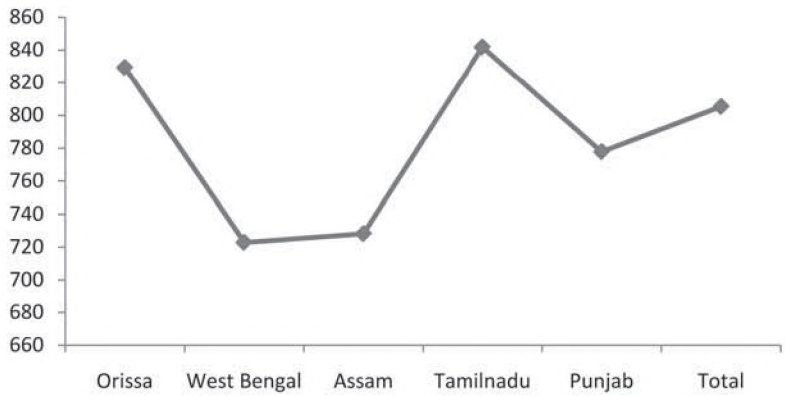


Fig 6.4: Female-male ratio of fish farmers in India

(iii) Family size

The family size is an important indicator of family welfare. The family of size less than 4 is a nuclear family where as the family with size higher than 7 or more is generally joint family even though there may be exception in each category. In the country, family size group of 2-4 constitutes 60 per cent where as 5-6 is 30 per cent. Other groups together constitute for only 10 per cent. Therefore it can be generalized that the fish farmers are mainly belong to nuclear families. In the southern states viz., AP and TN, 2-4 family size is more than 90 per cent where eastern states shown diverse patterns. Joint family is found more in the eastern states.

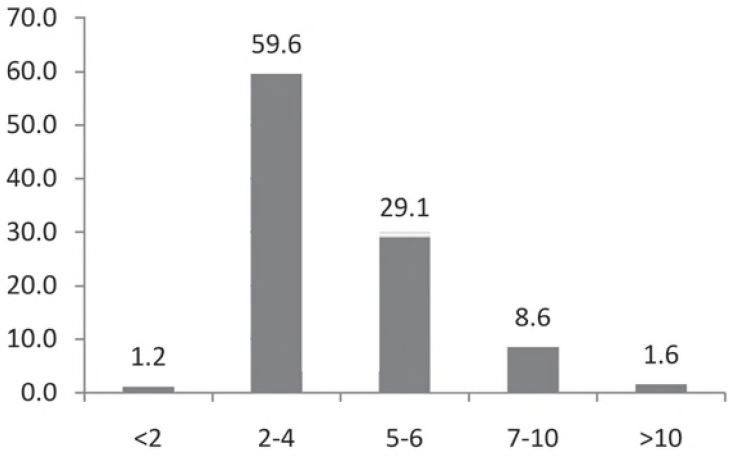


Fig 6.5: Family size of fish farmers in India

Table 6.4: Family size of the respondent household

Sl.No.	Family size	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
1.	<2	0 (0.0)	1 (1.0)	1 (1.0)	0 (0.0)	4 (8.0)	0 (0.0)	6 (1.2)
2.	2-4	57 (56.4)	37 (37.0)	41 (41.0)	92 (90.2)	46 (92.0)	26 (53.1)	299 (59.6)
3.	5-6	38 (37.6)	38 (38.0)	41 (41.0)	9 (8.8)	0 (0.0)	20 (40.8)	146 (29.1)
4.	7-10	6 (5.9)	17 (17.0)	16 (16.0)	1 (1.0)	0 (0.0)	3 (6.1)	43 (8.6)
5.	>10	0 (0.0)	7 (7.0)	1 (1.0)	0 (0.0)	0 (0.0)	0 (0.0)	8 (1.6)
6.	Total	101 (100.0)	100 (100.0)	100 (100.0)	102 (100.0)	50 (100.0)	49 (100.0)	502 (100.0)

Figures in parentheses indicate percentage to total

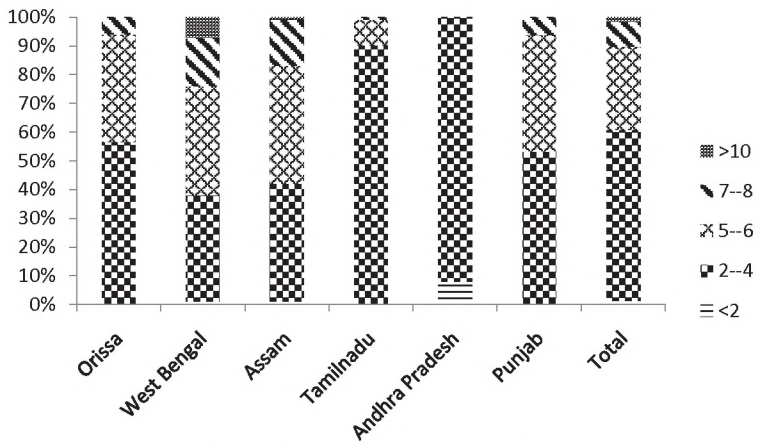


Fig 6.6: Family size of the respondent household

(iv) Age composition

In the fish farmers' family, the ratio of adult compared to children is quite high at about 74 per cent. The adult ratio was quite high for Orissa and Punjab. Exceptionally higher percentage of children was found in AP (36.4 per cent). The male is about 55 per cent compared to female of 45 per cent. The male ratio was similar across all the states except AP where male were less (39.7 per cent) compared to female.

Table 6.5 Composition of the respondent households (Number)

Sl.No.	Category	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
1.	Adult	372 (82.1)	442 (77.3)	336 (67.5)	279 (77.3)	51 (35.4)	190 (84.1)	1670 (74.1)
2.	Children	81 (17.9)	130 (22.7)	162 (32.5)	82 (22.7)	93 (64.6)	36 (15.9)	584 (25.9)
3.	Male	246 (54.7)	332 (58.0)	287 (57.9)	196 (54.3)	56 (39.7)	126 (56.3)	1243 (55.4)
4.	Female	204 (45.3)	240 (42.0)	209 (42.1)	165 (45.7)	85 (60.3)	98 (43.8)	1001 (44.6)

Figures in parentheses indicate percentage to total

B. Literacy profile

The literacy status of the respondent households was analyzed through the literacy level, educational status – continuing and dropouts, and access to educational facilities. The illiterate indicates fisher folk without any formal education and doesn't even possess functional literacy.

(i) Literacy status

The literacy status includes the level of education as indicated by primary, secondary and collegiate level. The primary level indicated schooling till fourth grade, secondary level indicated by high school. The collegiate level of education was denoted by college and professional education. The vocational education involved any formal education in vocational schools or college. Professionally educated ones attained some technical and professional education.

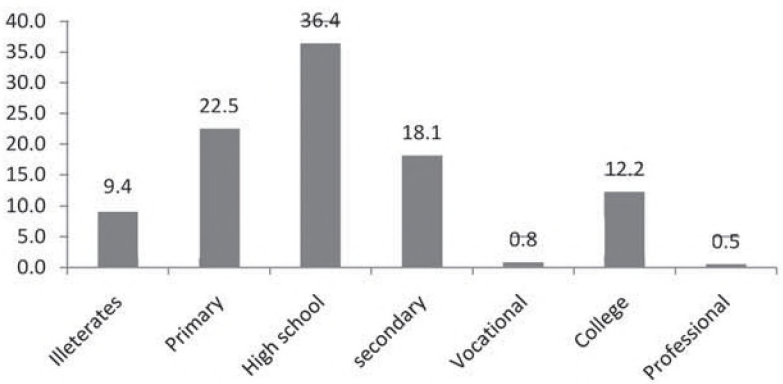


Fig 6.7: Education level of fish farmers of India

About 9 per cent of the farmers are illiterate. Primary, high school and higher secondary school constitute about 23, 36 and 18 per cent respectively. All these group together constitute about 86 per cent. In other words the fish farmers are predominantly within the group of functional education or less. Vocational, professional and college educated farmers are very less. Comparatively, the educational level was found to be higher in case of Punjab and TN. The education level was lower in Orissa and Assam.

Table 6.6. Educational status of fish farmers of India

Sl.No	Level of Education	Orissa	West Bengal	Assam	Tamil Nadu	A P	Punjab	Total
1.	Illiterates	52 (11.8)	52 (9.5)	63 (13.7)	6 (1.7)	10 (7.8)	18 (8.4)	201 (9.4)
2.	Primary	185 (42.1)	109 (20.0)	45 (9.8)	57 (16.2)	29 (22.5)	(56 (26.2)	(481 (22.5)
3.	High school	104 (23.7)	158 (29.0)	287 (62.4)	117 (33.2)	72 (55.8)	41 (19.2)	779 (36.4)
4.	Secondary	39 (8.9)	189 (34.7)	36 (7.8)	87 (24.7)	0 (0.0)	37 (17.3)	388 (18.1)
5.	Vocational	0 (0.0)	0 (0.0)	0 (0.0)	13 (3.7)	5 (3.9)	0 (0.0)	18 (0.8)
6.	College	57 (13.0)	37 (6.8)	29 (6.3)	69 (19.6)	13 (10.1)	56 (26.2)	261 (12.2)
7.	Professional	2 (0.5)	0 (0.0)	0 (0.0)	3 (0.9)	0 (0.0)	6 (2.8)	11 (0.5)
8.	Total	439 (100.0)	545 (100.0)	460 (100.0)	352 (100.0)	129 (100.0)	214 (100.0)	2139 (100.0)

Figures in parentheses indicate percentage to total

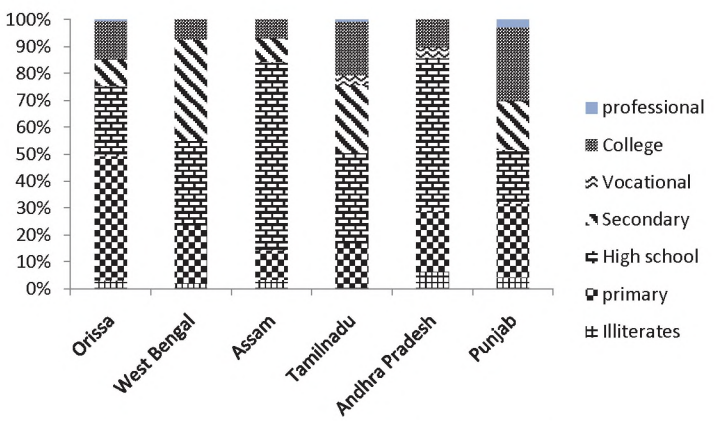


Fig 6.8. Educational status of fish farmers of India

(ii) Dropouts among the fish farmers household

The educational status needs to be studied along with the drop-out rates as the drop-outs are the voluntary or involuntary discontinuation of the education. The drops outs were also the indicators of the termination of the education. The dropouts along with the level of education shows the level at which farmers drop out from school. As we have seen in the

earlier section that the level of educational attainment is quite low. In the whole sample about 70 per cent are drop outs. Most of the states have more than 70 per cent of dropouts except Andhra Pradesh where dropout case is low (38.7 per cent)

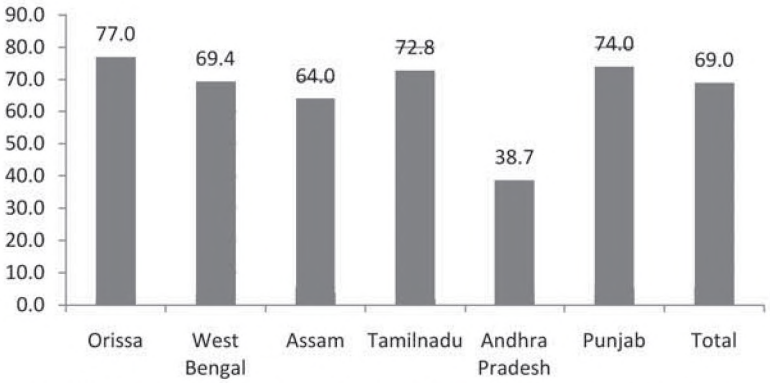


Fig 6.9: School drop-outs among the fish farmers household of India

Table 6.7: Dropouts among the fish farmers household of India

	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Dropouts (N)	298	342	254	252	46	145	1337
Literates (N)	387	493	397	346	119	196	1938
Per cent dropouts	77.0	69.4	64.0	72.8	38.7	74.0	69.0

(iii) Access to educational institutions

Access to education is an important yardstick to measure the socio-economic well being of a society. The proximity of the educational institutions like primary school, high school, college and professional college provides a major impetus when it comes to continuing education. The higher distance to the educational institutions reduces the access to it and there is a greater chance of drop outs when the schools or colleges were distantly located. The analysis was presented to evaluate the physical access to education.

The distance to the schools is considered to be an important indicators to the access to education especially for the fisher communities who access the institutions through walk or cycle. The average distance to the primary schools for the aquaculturists, in Orissa was reported to be 0.9 kilometer. The maximum was about 2.0 kilometer in Tamil Nadu. This distance indicates that the primary schools were located either in the same villages or very near to the village. In case of the secondary school the average distance was 1.9 kilometers with highest of 3.6 in AP which can be considered to be accessible but the distance to the colleges and professional institutions were about 11.3 and 21.2 kilometers, respectively. This distance can be considered to be very high as such distance cannot easily be traded by walk or cycle. Therefore, it can be concluded that the primary and secondary schools were accessible but colleges and professional institutions were distantly located. It is interesting to note that even though distances across all categories were less in Orissa the educational attainment was low and it is showing a reverse trend in the case of Punjab.

Table 6.8: Access to education institutions (km)

Educational Institutions	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Primary school	0.7	0.8	0.4	2.1	2.0	0.3	0.9
Secondary school	1.3	2.1	1.1	2.8	3.6	1.2	1.9
College	5.5	32.6	5.8	5.7	8.5	7.6	11.3
Professional college	7.7	33.0	-	17.0	-	34.9	21.2

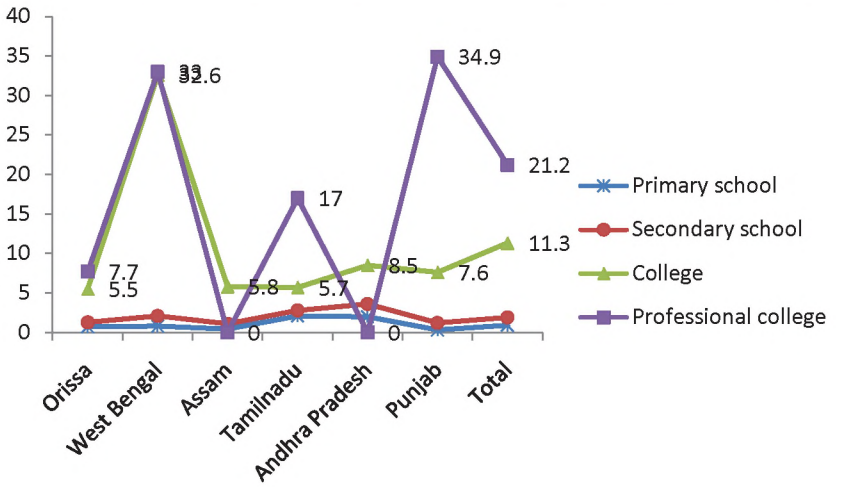


Fig 6.10: Access to educational institutions (km)

C. Health profile of respondent households

The health status of the respondent households was studied based on the parameters like administration of vaccines, incidence of discontinuation, birth weight of infants, incidence of maternal and child mortality at the time of birth, incidence of common diseases and special ailments among adults and children. Disease management aspects like access to health care, problems in health management and suggestions to improve the health care facilities are also dealt in this session.

(i) Vaccination regime and incidence of disease

The vaccination for Pox, BCG, MMR and Polio was regularly taken by all the families covered under the study. The average age at which the vaccination for pox was given to the child is worked out to be one year as all the households taking these vaccines were insisted to be taken in the first year of the child birth. Where as the vaccination for the households taking polio were taken upto 5 years as per the practice prevalent and recommendation made by the local hospital and paramedics. The percentage discontinuation was found only in few households, where as all of the other households reported that they vaccinated their child as per schedules recommended by medics. The level of vaccination reported from the three states illustrates that all the four categories of the vaccines were quite satisfactory. Though most of the families reported that their children were vaccinated, there were reported cases of

non vaccination in Tamil Nadu. The primary reasons for the discontinuation of vaccine were found to be lack of awareness and knowledge about the vaccination programmes.

Table 6.9 : Vaccination reported by household having children in percentage

Vaccines	Orissa	Tamil Nadu	Andhra Pradesh	Punjab	Total
BCG	100.0	67.3	98.6	100.0	91.3
MMR	100.0	80.8	98.6	100.0	94.7
Polio	98.2	100.0	98.6	100.0	99.0
POX	98.2	76.9	98.6	100.0	93.2

Table 6.10: Percentage of households continuing with vaccination

Vaccines	Orissa	West Bengal	Tamil Nadu	Total
BCG	81.8	100.0	100.0	95.6
MMR	81.8	100.0	100.0	95.6
Polio	80.0	100.0	100.0	95.2
POX	80.0	100.0	100.0	95.2

(ii) Birth weight of infants

Birth weights are considered as an important indicator of the health status of the mother and the families. The birth weight in comparison to the state or national average can be an important indicator to assess mother's health status. The average birth weights for the male and female were 2.9 and 2.8 kg, respectively. It was comparatively less (2.1 & 2.3) in Orissa and high for Punjab, Assam and West Bengal.

Table 6.11: Birth weight of infants

Gender	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Male	2.1	2.9	3.1	2.6	2.8	3.2	2.9
Female	2.3	2.8	3.0	2.5	3.0	3.0	2.8

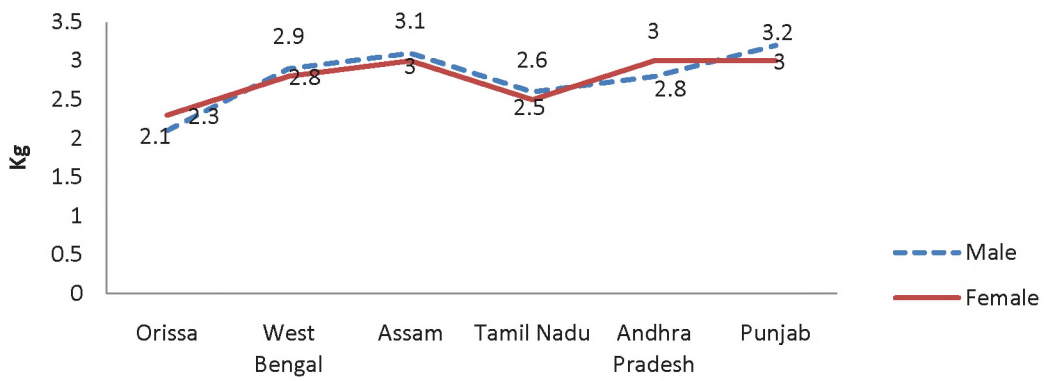


Fig. 6.11: Birth weight (kg)

(iii) Incidence of mortality among mother/ child during birth

Maternal and child mortality at the time of birth and infant mortality had been pressing concerns over the past. The mortality is an extreme case of failure of the socio-environmental system to protect the mothers. The incidence of mortality was therefore an indicator of the health status of the mother and family. Only two cases of maternal mortality was reported across the households. Whereas Anugul district there were six cases of child mortlaity was reported which is a cause of serious concern.

Table 6.12: Incidence of mortality among mother/ child during birth (Number) in Orissa

District	No of delivery	Maternal Mortality	percentage	Child Mortality	percentage
Cuttack	16	-	0.0	1	6.3
Khurda	21	-	0.0	1	4.8
Puri	22	-	0.0	-	0.0
Boudh	13	-	0.0	1	7.7
Anugul	10	1	10.0	6	60.0
Sonepur	19	-	0.0	1	5.3
Orissa	101	1	1.0	10	9.9

The reasons reported for the death of mother and child in Anugul district was mainly due to accident during pregnancy. The other less important reasons were lack of vaccination, lack of medical facilities, disease and weakness or poor health of mother.

(iv) Incidence of diseases among the fish farmers

The incidence, frequency, and previous occurrence of diseases among the adult family members of the respondents across the four coastal districts are discussed in the Table 6.13. Major diseases found among the respondents were categorized under two groups, viz; common diseases and special ailments. Fever/flu, body ache, diarrhoea, gastro enteric disease, skin disorder and reproductive disorders are included in common diseases. Special ailments include diseases like cardiac failure, tuberculosis, anaemia, diabetics, blood pressure, AIDS and others. For most of the common diseases the males were reported to be more prone to them than females. The average annual frequency for all of the them for males was about twice a year and for female it was more than once. The fevers among males is quite common when compared to females, a large number of males were suffering from stomach problems. The body aches were reported to be very high among the males (3 times in a year) compared to females. The occurrence of special ailments was very less. However it is important to note that of the occurrence of anaemia was higher in case of males than females.

In the Table 6.13 the occurrence of various diseases as reported by the households are being presented as percentage of household reported the occurrence of such disease during the last one year period. Fever is most common among the diseases with the adult male, adult female, child male and child female in the descending order of the occurrence as high as 65

per cent of the male in all sample and it is ranged between 12.2 per cent in Punjab and 99 per cent in Orissa from as high as 99 per cent in Orissa. But the female children reported very low occurrence of diseases.

The body ache and gastroenteric diseases were also the commonly occurring diseases and about one third of the male population of the total sample was suffering from these diseases.

Table 6.13.a: Incidence of disease - Fever as percentage of household reported

Fever	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	99.0	72.0	77.0	37.3	52.0	12.2	63.5
Adult female	71.3	72.0	74.0	26.5	32.0	24.5	54.4
Children male	48.5	38.0	18.0	27.5	14.0	10.2	28.9
Children female	21.8	22.0	11.0	13.7	16.0	8.2	16.1

Table 6.13.b: Incidence of disease
Body ache as percentage of household reported

Body ache	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	6.9	10.0	45.0	42.2	92.0	0.0	30.1
Adult female	5.0	28.0	42.0	31.4	34.0	4.1	25.1
Children male	0.0	0.0	1.0	3.9	12.0	2.0	2.4
Children female	0.0	1.0	0.0	4.9	12.0	0.0	2.4

Table 6.13.c: Incidence of disease
Diarrhoea as percentage of household reported

Diarrhoea	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	9.9	5.0	21.0	8.8	62.0	0.0	15.1
Adult female	3.0	2.0	21.0	10.8	22.0	0.0	9.6
Children male	9.9	3.0	5.0	17.6	6.0	0.0	7.8
Children female	2.0	0.0	8.0	13.7	6.0	0.0	5.4

Table 6.13.d: Incidence of disease -
Gastro enteric as percentage of household reported

Gastro enteric disease	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	49.5	24.0	66.0	20.6	0.0	0.0	32.1
Adult female	6.9	20.0	42.0	10.8	0.0	2.0	16.1
Children male	0.0	0.0	1.0	7.8	0.0	0.0	1.8
Children female	0.0	4.0	1.0	6.9	0.0	0.0	2.4

Table 6.13.e: Incidence of disease -TB as percentage of household reported

T B	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	2.0	0.0	0.0	3.9	0.0	0.0	1.2
Adult female	1.0	0.0	0.0	1.0	0.0	0.0	0.4
Children male	0.0	0.0	0.0	1.0	0.0	0.0	0.2
Children female	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 6.13.f: Incidence of disease -
Cardiac failure as percentage of household reported

Cardiac failure	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	3.0	22.0	3.0	2.9	32.0	0.0	9.4
Adult female	0.0	4.0	2.0	2.9	20.0	0.0	3.8
Children male	2.0	3.0	0.0	0.0	8.0	0.0	1.8
Children female	0.0	0.0	0.0	0.0	6.0	0.0	0.6

Table 6.13.g:Incidence of disease -
Skin disorder as percentage of household reported-

Skin disorder	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	11.9	0.0	0.0	19.6	0.0	0.0	6.4
Adult female	3.0	0.0	2.0	10.8	0.0	0.0	3.2
Children male	8.9	0.0	0.0	15.7	0.0	0.0	5.0
Children female	2.0	0.0	0.0	13.7	0.0	0.0	3.2

Table 6.13.h: Incidence of disease -
Reproductive disorder as percentage of household reported

Reproductive disorder	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	0.0	2.0	0.0	1.0	0.0	0.0	0.6
Adult female	2.0	33.0	26.0	0.0	0.0	0.0	12.2
Children male	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Children female	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 6.13.i: Incidence of disease – Anaemia as percentage of household reported

Anaemia	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	14.9	0.0	0.0	2.9	0.0	0.0	3.6
Adult female	0.0	0.0	0.0	6.9	0.0	0.0	1.4
Children male	0.0	0.0	0.0	17.6	0.0	0.0	3.6
Children female	0.0	0.0	0.0	15.7	0.0	0.0	3.2

Table 6.13.j: Incidence of disease – AIDS as percentage of household reported occurrence

AIDS	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	0.0	6.0	2.0	0.0	0.0	0.0	1.6
Adult female	0.0	0.0	3.0	0.0	0.0	0.0	0.6
Children male	0.0	0.0	2.0	0.0	0.0	0.0	0.4
Children female	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 6.13.k: Incidence of disease – Other diseases percentage of household reported occurrence

Other Diseases	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	10.9	40.0	3.0	1.0	0.0	10.2	12.0
Adult female	4.0	14.0	2.0	1.0	0.0	12.2	5.4
Children male	0.0	3.0	1.0	0.0	0.0	0.0	0.8
Children female	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(v) Intensity of incidence of disease

The intensity of the occurrence is measured through the number of times a particular disease occurs in a year. The reported cases of diseases among the total population in last one year is presented in the tables below.

Table 6.14.a: Incidence of disease (Annual frequency) (Fever)

Fever	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	1.8	1.2	1.4	2.4	1.0	1.3	1.5
Adult female	1.6	1.8	1.3	2.5	1.0	2.8	1.7
Children male	2.5	1.7	1.2	2.3	1.0	1.6	2.0
Children female	1.9	1.9	1.1	1.0	1.0	1.8	1.5

Table 6.14.b. Incidence of disease (Annual frequency) (Bodyache)

Bodyache	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	3.0	5.9	1.2	2.3	2.2	.	2.2
Adult female	2.2	10.9	1.6	1.8	1.2	2.5	3.7
Children male	.	.	1.0	1.3	1.7	1.0	1.4
Children female	.	12.0	.	1.0	1.2	.	2.0

Table 6.14.c. Incidence of disease (Annual frequency) (Diahorrea)

Diahorrea	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	2.0	2.8	1.3	1.1	1.2	.	1.4
Adult female	1.7	2.0	1.0	1.3	1.3	.	1.2
Children male	2.5	1.0	1.0	1.0	1.0	.	1.4
Children female	2.5	.	1.0	1.0	1.0	.	1.1

Table 6.14.d. Incidence of disease (Annual frequency) (Gastroenteric)

Gastroenteric	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	2.1	3.5	1.3	1.0	.	.	1.9
Adult female	1.7	4.1	1.4	1.0	.	2.0	2.0
Children male	.	.	1.0	1.0	.	.	1.0
Children female	.	7.0	2.0	1.0	.	.	3.1

Table 6.14.e. Incidence of disease (Annual frequency) (TB)

TB	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	1.0	.	.	2.8	.	.	2.2
Adult female	1.0	.	.	2.0	.	.	1.5
Children male	.	.	.	2.0	.	.	2.0
Children female	.	.	.	.	.	.	.

Table 6. 14.f. Incidence of disease (Annual frequency) (Skin disorder)

Skin disorder	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	2.0	.	.	1.3	.	.	1.6
Adult female	1.7	.	1.0	1.0	.	.	1.1
Children male	1.6	.	.	1.0	.	.	1.2
Children female	2.0	.	.	1.0	.	.	1.1

Table 6.14.g: Incidence of disease (Annual frequency) (Reproductive disorder)

Reproductive disorder	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	.	12.0	.	2.0	.	.	8.7
Adult female	1.0	12.0	1.0	.	.	.	7.0
Children male	.	.	.	.	.	.	.
Children female	.	.	.	.	.	.	.

Table 6.14.h: Incidence of disease (Annual frequency) (Anaemia)

Anaemia	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	1.9	.	.	2.0	.	.	1.9
Adult female	.	.	.	1.9	.	.	1.9
Children male	.	.	.	1.3	.	.	1.3
Children female	.	.	.	1.0	.	.	1.0

Table 6.14.i Incidence of disease (Annual frequency) (Others)

Others	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	1.9	11.2	2.0	2.0	.	1.2	8.0
Adult female	1.5	12.0	1.0	1.0	.	1.8	7.0
Children male	.	12.0	1.0	.	.	.	9.3
Children female	.	.	.	.	.	.	.

(vi) Incidence of diseases among adult (male and female) previous occurrence

The previous occurrence of the disease is measured in months and is being reported in tables below.

Table 6.15.a: Previous occurrence in months (Fever)

Fever	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	3.6	3.0	.	2.5	1.4	3.9	3.1
Adult female	4.2	3.8	.	2.2	1.3	3.2	3.5
Children male	2.5	2.6	.	5.0	.	2.2	3.0
Children female	3.9	2.7	.	1.5	1.5	1.8	2.8

Table 6.15.b: Previous occurrence in months (Bodyache)

Body ache	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	3.1	2.5	1.0	3.0	2.0	.	2.9
Adult female	4.0	1.2	.	1.2	2.0	2.0	1.5
Children male	.	.	.	2.2	1.0	.	2.2
Children female	.	1.0	.	1.0	.	.	1.0

Table 6.15.c: Previous occurrence in months (Diarrhoea)

Diarrhoea	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	3.8	2.8	.	1.0	3.0	.	1.9
Adult female	4.7	3.0	.	1.0	.	.	1.5
Children male	2.5	4.0	.	1.0	1.0	.	2.0
Children female	2.5	.	1.0	1.0	.	.	1.4

Table 6.15.d. Previous occurrence in months (Gastro enteric)

Gastroenteric	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	3.2	3.1	.	1.0	1.7	.	2.9
Adult female	5.3	3.0	2.0	1.0	.	1.0	2.6
Children male	.	.	.	1.0	.	.	1.0
Children female	.	2.3	.	1.0	.	.	1.4

Table 6.15.e: Previous occurrence in months (TB)

TB	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	5.7	.	.	22.0	.	.	13.8
Adult female	.	.	.	24.0	.	.	24.0
Children male	.	.	.	24.0	.	.	24.0
Children female	.	12.0	.	.	.	.	12.0

Table 6.15.f: Previous occurrence in months (Skin disorder)

Skin disorder	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	2.6	.	.	7.1	.	.	5.5
Adult female	3.3	.	.	1.0	1.0	.	1.3
Children male	3.4	.	.	1.0	.	.	2.5
Children female	3.5	.	.	1.0	.	.	2.0

Table 6.15.g: Previous occurrence in months (Reproductive disorder)

Reproductive disorder	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	.	1.0	.	24.0	.	.	8.7
Adult female	1.5	1.0	.	.	.	.	1.0
Children male	.	.	.	.	.	.	.
Children female	.	.	.	.	.	.	.

Table 6.15 h: Previous occurrence in months (Anemia)

Anaemia	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	2.8	.	.	1.0	.	.	1.8
Adult female	.	.	.	1.0	.	.	1.0
Children male	.	.	.	11.8	.	.	11.8
Children female	.	.	.	6.5	.	.	6.5

Table 6.15 i: Previous occurrence in months (Others)

Others	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Adult male	4.1	1.2	.	2.0	.	1.0	1.8
Adult female	4.3	1.0	.	1.0	.	2.0	1.7
Children male	.	1.0	.	.	.	.	1.0
Children female	.	.	.	.	.	.	.

(vii) Access to health care

The access to health care is an important indicator of the human development as the reach of the health care service determines the state of health of the communities. There are many parameters to measure the access to the health services but among them the physical distance is an important parameter. The physical distance is important as the poor fishing communities may have limited access to the modern means of conveyance and hence depend heavily on walk or cycle etc. Therefore, the distance determines the access to the health care in a greater extent. In the present survey, the physical distance in terms of kilometers to the hospital was studied to assess the state of access of the fishers communities to the health care services.

For the fishers involved in the freshwater aquaculture, the average distance to the hospital was 6.8 kilometers and for the PHC it was only 2.3 km. Among the states there were wide variations in the average distance to health care facilities ranging from 14.5 km in West Bengal and 1.1 km in Punjab.

Table 6.16: Access to Health care (km)

	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
Distance to PHC	1.9	2.8	2.0	1.9	3.4	1.0	2.3
Distance to hospital	4.7	14.5	4.0	7.5	7.3	1.1	6.8

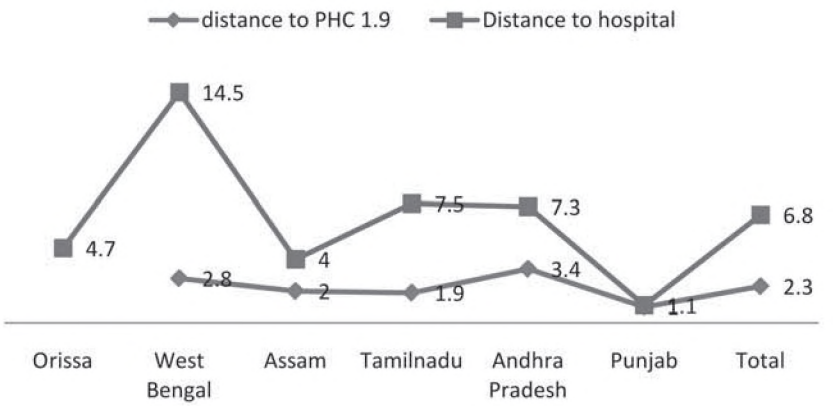


Fig. 6.12: Access to the health care centre as measured in term of distance in km

(viii) Problems in health management

Various problems of the health management were investigated in the survey by using open ended questions of important problems affecting the health in the sampled area in order of priority. Then each household were asked to identify the most important problem. The Table 6.17 depicts the results of the survey.

In Orissa lack of medical facilities was identified to be the most important problem in the health management followed by financial problems. This is followed by the problems of the sanitation and water problems. It is interesting to note that very few of them could identify the poor working condition as the problem affecting the health condition of the people. The absence of doctor in the hospital was a major problem identified for Andhra Pradesh.

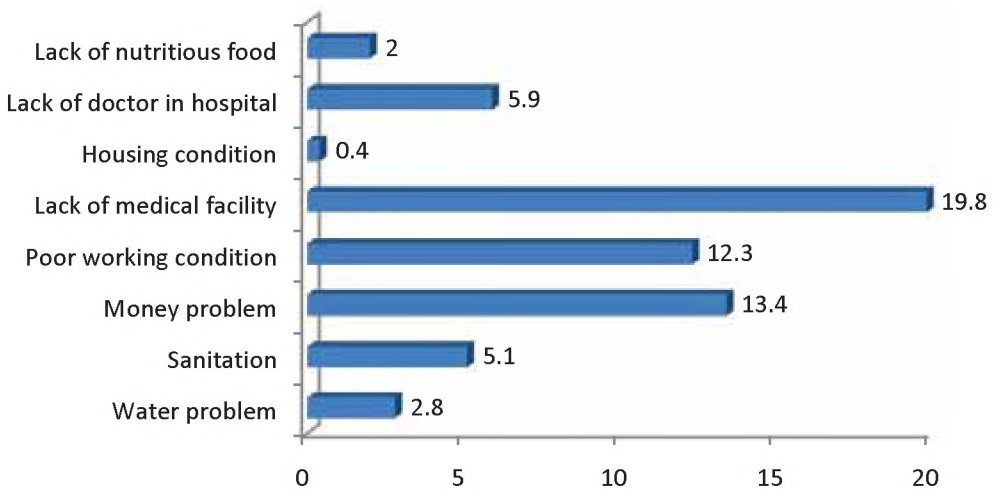


Fig. 6.13: Problems in health management

Table 6. 17: Problems in health management

Sl.No	Problems in health management	Orissa	TN	AP	Per cent of HH reported
1.	Water problem	3.9	3.0	0.0	2.8
2.	Sanitation	11.8	1.0	0.0	5.1
3.	Money problem	33.3	0.0	0.0	13.4
4.	Poor working condition	30.4	0.0	0.0	12.3
5.	Lack of medical facility	47.1	0.0	4.0	19.8
6.	Housing condition	0.0	1.0	0.0	0.4
7.	Lack of doctor in hospital	0.0	0.0	30.0	5.9
8.	Lack of nutritious food	4.9	0.0	0.0	2.0

For eliciting responses to the problems of health management in Krishna district an opinion scale of 1 to 5 was offered with 1 indicating total agreement with the statement of reason and 5 in total disagreement. Since the respondents are availing good services from the health institutions like PHC, district hospitals, they are satisfied with the health facilities available in their location.

Table 6.18: Problems in health management (frequency) in Krishna district of Andhra Pradesh

Sl.No.	Problems	frequency
1.	Difficulty in accessing the hospital due to distance	5
2.	Non availability of specialist and paramedics in health centers	5
3.	Poor infrastructure	4
4.	Lack of adequate effective medicines	4
5.	Problems on cleanliness/sanitation	4
6.	Drinking water problem	4
7.	Work related stress	5
8.	Others	5

(ix) Suggestions to improve health care

The respondents opined on the different suggestions for improving the health care facilities and the details are furnished in table 6.19. The major suggestions cited by the respondents included demand for free medicine, free supply of nutritious food, provision of quality drinking water facility. appointment of knowledgeable staff, and provision of better sanitation facilities.

Table 6.19: Suggestions to improve health services (per cent of household reported)

Sl.No	Suggestions	Frequency				
		Orissa	Assam	T N	A P	Total
1.	Sanitation facilities by Govt.	13.7	-	1.0	-	4.2
2.	Provision of free medicine by Govt.	21.6	-	-	-	6.2
3.	Provision of water facility by Govt.	18.6	-	-	-	5.4
4.	Provision of nutritious food by Govt.	19.6	-	-	-	5.7
5.	Appointment of knowledgeable staff	14.7	-	-	-	4.2
6.	Improvement of hospital facilities	8.8	5.0	-	-	4.0
7.	Govt. support for improvement of health	2.0	-	-	-	0.6
8.	Continuation of insurance	0.0	-	19.8	-	5.7
9.	Full time doctor	0.0	-	3.0	-	0.8
10	Specialist doctor	0.0	-		48.0	6.8

Fig 6.14: Suggestions for improving health care services

D. Income and expenditure profile

The income profile of the respondent households are analyzed using income patterns, respondents involvement in non fisheries activities and expenditure pattern. In addition the indebtedness and savings were analyzed using details on savings, indebtedness, sources of lending organization, purpose of availing loan and suggestions for enhancing the income and employment generation

Table 6.20: Occupational structure

Sl.No		Capture	Culture	Marketing
1.	Orissa	6.9	77.2	15.8
2.	Bengal	-	100.0	-
3.	Assam	-	100.0	-
4.	Tamil Nadu	-	100.0	-
5.	Andhra Pradesh	-	100.0	-
6.	Punjab	-	100.0	-

(i) Occupation structure

The primary occupation of all respondents across the states was fish farming except in Orissa where about 7 per cent of them were involved in capture fisheries and about 16 per cent in fish marketing enterprises.

(ii) Income pattern of respondent households

Weekly income of the fish farmers engaged in the freshwater aquaculture was assessed in this study and income profile of the respondents is furnished in Table 6.21. The lowest average weekly income per household was reported in Orissa at Rs. 7.10 with major contributions from agriculture (342.1 per cent), aquaculture (148.7 per cent), and business (141.6 per cent) The highest average weekly income per households was reported in Punjab at Rs. 16914.3 with significant contribution from aquaculture (Rs.1037.5), agriculture (Rs.3436.7)and business (Rs.2408.2). The labour and others constitute a small portion of the income of the people involved in the freshwater aquaculture. But the respondents from the states like West Bengal, Assam and Tamil Nadu were earning at about three to four thousand rupees in a year from labour. Among these states, about 70 per cent of the income was from aquaculture and rest either from agriculture or business. But in case of Andhra Pradesh and Punjab the income was quite high as the sampled households belong to large commercial farming group. The weekly income of respondents from various economic activities are given in Table 6.21. Income were derived from various sources like fishery, agriculture, manual labour and other businesses. The weekly average income of the respondents of Andhra Pradesh amounted to Rs.1731/-. Though income from their primary occupation was Rs.865/- per family, it was supplemented by other sources of income such as agriculture and small business. Female members of the fish farmers household were engaged in activities such as tailoring and house maid work and therefore the income obtained maybe justified. A correct apportioning of income across economic activities may not be available from the survey schedules. In case of Punjab, the aquaculture constituted the major share of income (61 per cent) followed by agriculture and business

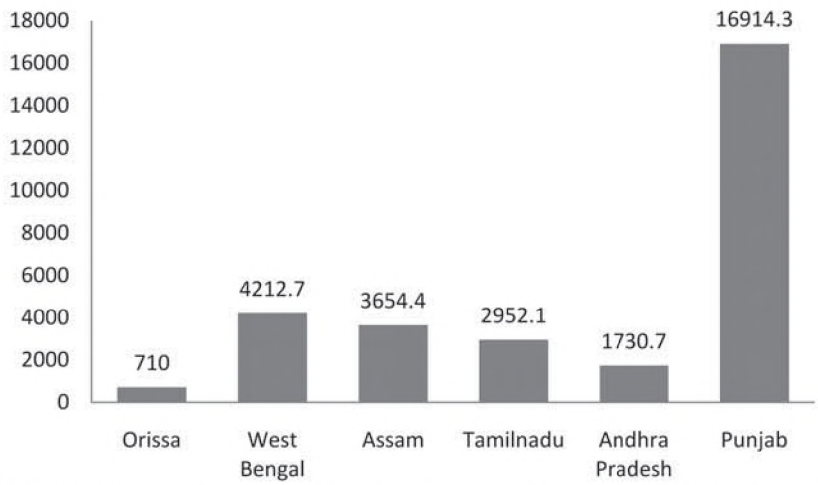


Fig. 6.15: Income profile of respondent per week across states for aquaculture farmers

Table 6.21: Income profile of the respondents (Weekly Rs.)

Sl.No	Sector	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab
1.	Aquaculture	148.7	2861.2	2366.0	2151.2	865.4	10375.5
2.	Agriculture	342.1	368.2	459.0	441.9	384.6	3436.7
3.	Business	141.6	439.2	751.2	197.5	384.6	2408.2
4.	Labour	47.9	299.1	78.2	42.2	192.3	40.8
5.	Others	29.7	245.0	0.0	119.2		653.1
6.	Total	710.0	4212.7	3654.4	2952.1	1730.7	16914.3

Table 6.22. Income composition of respondent (Percentage)

Sl.No	Sectors	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
1.	Aquaculture	20.9	67.9	64.7	72.9	89.4	61.3	79.8
2.	Agriculture	48.2	8.7	12.6	15.0	4.2	20.3	8.8
3.	Business	19.9	10.4	20.6	6.7	0.6	14.2	5.4
4.	Labour	6.7	7.1	2.1	1.4	5.9	0.2	4.6
5.	Others	4.2	5.8	0.0	4.0	0.0	3.9	1.3

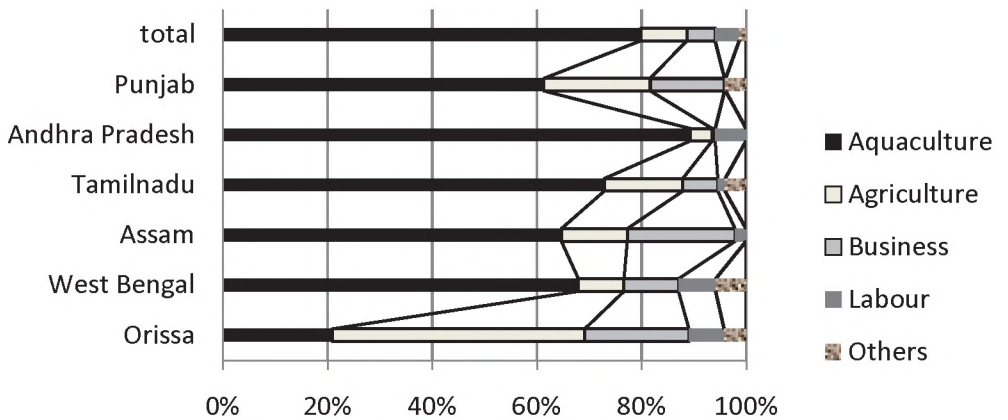


Fig 6.16: Share of source of income

(iii) Involvement in non-fisheries activities

The involvement of respondent households in non fisheries activities are illustrated in the Table 6.23. The level of the involvement in non fisheries activities was indicative of the livelihood diversity. It is generally understood that the diversified portfolio of the income helps in reducing the seasonality and increases the adaptability to the risk and uncertainty in the livelihoods. Business and agriculture were the major non fishing activities for 75.2 per cent and 35.6 per cent of the respondents in Orissa.

In Tamil Nadu all the respondent households were having multiple sources of income and all the respondent households engaged in all the non fishing activities enlisted. Among the respondent households of all states, business (69.1 per cent) was predominant source of income followed by labour (44.5 per cent) and agriculture (42.1 per cent).

(iv) Expenditure patterns

The expenditure is considered to be the most important indicators of the income and poverty as the income data are often unreliable. The expenditure patterns not only show the net expenditure but also the qualitative information of the expenditure across various heads. Table 6.24 is being constructed to analyse the expenditure of the fishers and fish farmers of India. The important expenditure heads including food, clothing, fuel, education, medical expenses, entertainment, durables, personal etc. were studied. The total expenditure per households per week among the fish farmers of the freshwater aquaculture was reported to be in the range from Rs.613.9 in Orissa to Rs. 20896.2 in Punjab. On an average weekly expenditure of fresh water fish farmes across the states was Rs. 4552.2. Responsdent households in Orissa and Assam spent more than 50 per cent of their income on food. Likewise, West Bengal and Tamil Nadu also spent major portion of their income for food with 49.7 per cent and 39.7 per cent respectively. Whereas in the case of household expenditure of respondents of Punjab, they spent their major share on durables (71.2 per cent) and only 13.2 per cent was spent on food. Generally expenditure pattern changes with improvement in economic status and people with high income spend comparatively small share of their income on food like in the case of respondents in Punjab.

Table 6.23: Source of income (Percentage of household reported)

Sl.No	Sector	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
1.	Business	75.2	73.0	58.0	100.0	14.0	62.5	69.1
2.	Agriculture	35.6	12.0	55.0	100.0	2.0	10.4	42.1
3.	Labour	15.8	79.0	11.0	100.0	28.0	2.1	44.5
4.	Others	5.0	4.0	0.0	0.0	0.0	6.3	22.8

Table 6.24: Weekly expenditure per households (Rs.)

Sl.No	Item	Orissa	West Bengal	Assam	Tamil Nadu	Punjab	Total
1.	Food	364.5	1582.5	1158.0	1568.0	2753.1	1308.7
2.	Clothing	37.3	332.6	155.4	526.6	157.8	216.4
3.	Fuel for cooking	25.2	226.5	31.2	182.2	122.8	108.7
4.	Medical expenses	48.9	329.1	216.5	256.4	50.2	187.0
5.	Education	38.4	361.8	182.6	778.3	817.6	342.5
6.	Entertainment	39.5	165.2	37.3	302.7	0.0	98.4
7.	Personal	58.1	186.5	256.0	319.0	2117.3	423.0
8.	Durable	2.0	0.0	0.0	429.8	14877.6	1867.4
9.	Total	613.9	3184.1	2037.0	4362.9	20896.2	4552.2

(v) Indebtedness and Savings

The indebtedness and loan details are important to understand the level of distress within the household of the fish farmers and fishers involved in the fisheries and aquaculture. The frequency of loans taken and the amounts were studied and is presented in Table 6.26. The number of people out of total households who had taken loan was indicative of the financial independence of the community. Similarly, the actual amount of the loan per household was indicative of the community dependence. The loan amount was indicative of the actual level of dependence to the credit. Overall 43 per cent of the fish farmers household were reported to have taken some kind of loan, with highest in the case of Andhra Pradesh and Orissa. The average loan amount for the fish farmers was Rs. 48797. It is important to note that almost all

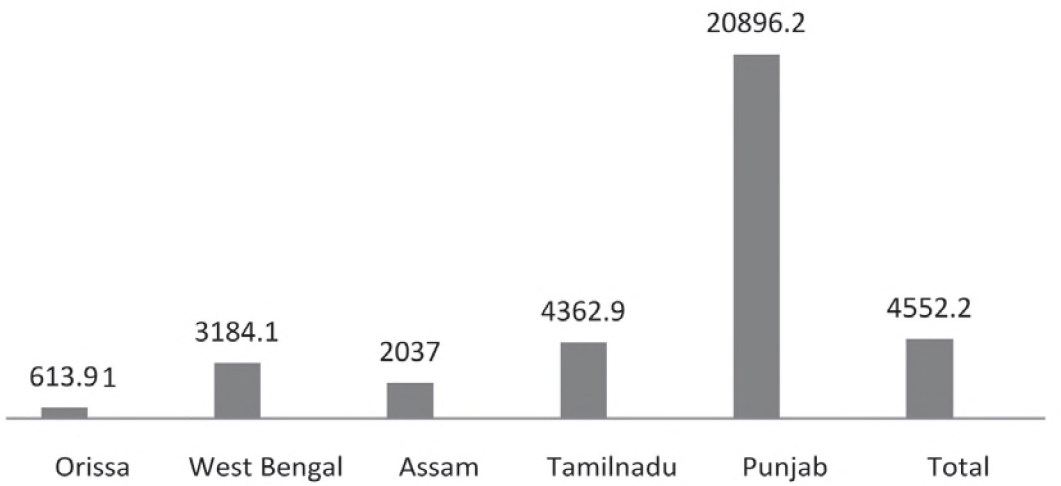


Fig 6.17. Weekly expenditure in Rupees

Table 6.25: Expenditure composition

Sl.No	Item	Orissa	West Bengal	Assam	Tamil Nadu	Punjab	Total
1.	Food	59.4	49.7	56.8	35.9	13.2	28.7
2.	Clothing	6.1	10.4	7.6	12.1	0.8	4.8
3.	Fuel for cooking	4.1	7.1	1.5	4.2	0.6	2.4
4.	Medical expenses	8.0	10.3	10.6	5.9	0.2	4.1
5.	Education	6.3	11.4	9.0	17.8	3.9	7.5
6.	Entertainment	6.4	5.2	1.8	6.9	0.0	2.2
7.	Personal	9.5	5.9	12.6	7.3	10.1	9.3
8.	Durable	0.3	0.0	0.0	9.9	71.2	41.0
9.	Total	100.0	100.0	100.0	100.0	100.0	100.0

the fish farmers of the Andhra Pradesh have taken loan with the average loan amount of Rs. 42500. In case of Punjab about 31 per cent of the farm households have taken loan with the average loan amount of Rs. 2.7 lakh. Personal expenses are primarily that of males in the fish farmers households. Social evils like drinking and gambling take a heavy toll on the potential savings of the fishers community in Krishna (FWA). Social evils like drinking and gambling take a heavy toll on the potential savings of the fishers community in Krishna (FWA).

The saving details of the respondent house holds across states indicated that around 50 per cent of the respondence had no saving. It was found the only 10 per cent of the respondents possessing saving above Rs. 50,000 and others having less than Rs. 50,000 as their toral savings. In case of West Bengal, indebtedness is a social issue and needs to be controlled. Average indebtedness among the respondents across sectors ranged from Rs. 5000 to Rs. 30,000 or more. The loans were normally taken for tiding over emergency crop/ equipment repair works and sometimes for meeting social obligations.

(vi) Source of lending

There were many sources for lending viz., banks, private moneylenders, friends, self-help group, private company, cooperative society and cooperative bank. These sources were diverse with differential institutional arrangement in supply of the credit to the fishers. The private money lenders and friends are the informal sources where as others are the formal sources

Table 6.26: Household reported to have taken loan among fish farmers

	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
N	85	33	13	22	49	15	217
per cent	84.2	33.0	13.0	21.6	98.0	30.6	43.2
loan/hh	6047	20730	13890	49348	42500	270714	48797

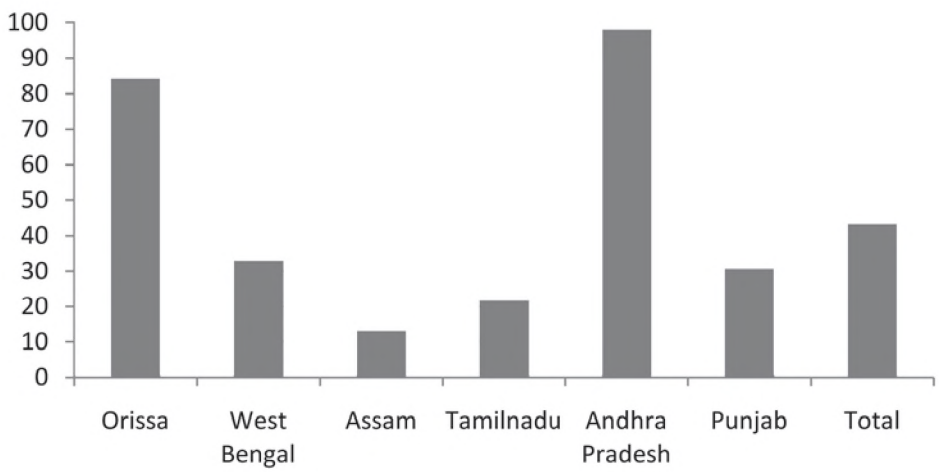


Fig 6.18: Percentage of household taken loan

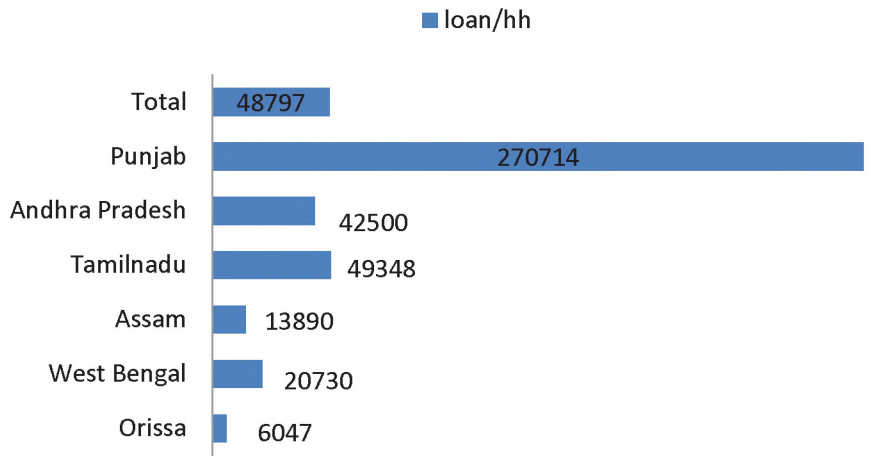


Fig 6.19: Loan in rupees per households

in the credit supply. The Table 6.27 presents the percentage distribution of the loans across the sources. Majority of the respondent fish farmers (70.7 per cent) across the states depend mainly on bank for availing loans. Respondents of Assam and Punjab solely depend on bank for loans. Interestingly, 61.2 per cent respondents of Andhra Pradhesh depend on private money lenders for availing loans. SHGs also was a good source of loan for 16.7 per cent of respondents in Orisaa and 3.1 per cent in West Bengal.

(vii) Purpose of loan

The purpose of loan in terms of percentage of households availed the same is illustrated in Table 6.28. The major purpose of taking loans among the respondents was for aquacultre. On an average 38.3 per cent of the respondents availed loan for aquaculture across the states and it was the only reason for taking loan among all the respondents of AP. About 46.2 per cent of respondent in Assam and 22.2 per cent in Tamil Nadu was availed loan for aquacultre. Another important reason for availing loan was agricultre puporse. An average of 35.1 per cent of households availed loan for the same which is constitued by respondents of Orissa (77.8 per cent), West Bengal (73.9 per cent), Assam (46.2 per cent) and Tamil Nadu (16.7 per cent). Other reasons for availing loan include construcion of house (13.6 per cent), pond construcions (1.3 per cent) health expenditure (0.6 per cent), business (3.2 per cent), marriage (0.6 per cent), consumption (3.2 per cent) and education

Table 6.27: Sources of lending (Number)

Sl.No	Lending organization	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
1.	Bank	75.0	81.3	100.0	81.0	38.8	100.0	70.7
2.	Private money lender	-	9.4	-	9.5	61.2	-	21.0
3.	Friends	5.6	-	-	-	-	-	1.2
4.	SHG	16.7	3.1	-	-	-	-	4.2
5.	Cooperative society	2.8	6.3	-	9.5	-	-	3.0

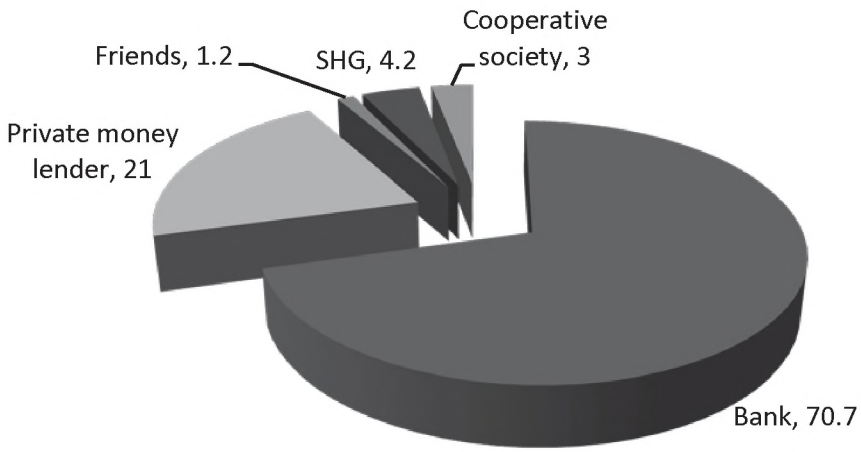


Fig 6.20: Percentage of household having access to lending organisation

(viii) Suggestions to improve indebtedness

The survey sought open ended suggestions from the respondent about the options to reduce the loan burden. The suggestions are presented in Table 6.29 as percentage response to the various options. The primary options as perceived by the fish farmers were loan weaver by the government or freeing of interest on the outstanding loans. Some of the other suggestions were providing govt loan, more loans by the bank and government support etc. In West Bengal regulation of fish market was the prime need of almost all the sampled population through institutional interventions. Also, 80 per cent agreed for provision of rural infrastructure for general societal human development especially for fisheries development.

In Andhra Pradesh, multiple scoring was used for assessment of suggestions for enhancement of income and employment. Institutional financial support (6 5per cent); better regulation of marketing arrangements (15 per cent); developing other livelihood enterprises (10 per cent) and streamlining PDS and supply of fuel would go a long way to enhance income and employment among the fish farmers in the district of Krishna of Andhra Pradesh (Table 6.30).

Table 6.28: Purpose of loan

Sl. No.	Purpose of lending	Orissa	West Bengal	Assam	Tamil Nadu	Andhra Pradesh	Punjab	Total
1.	Construction of house	13.9	-	-	5.6	-	100.0	13.6
2.	Agriculture	77.8	73.9	46.2	16.7	-	-	35.1
3.	Pond construction	5.6	-	-	-	-	-	1.3
4.	Health expenditure	2.8	-	-	-	-	-	0.6
5.	Aquaculture	-	-	46.2	22.2	100.0	-	38.3
6.	Business	-	8.7	-	16.7	-	-	3.2
7.	Marriage	-	-	-	5.6	-	-	0.6
8.	Consumption expenditure	-	17.4	7.7	-	-	-	3.2
9.	Education	-	-	33.3	-	-	3.9	-

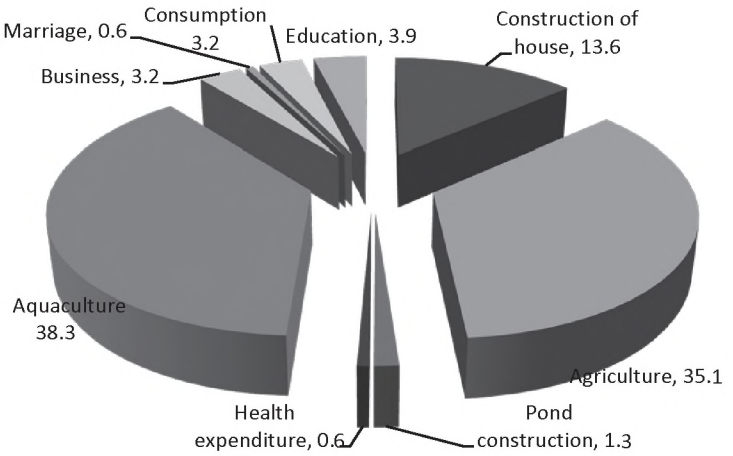


Fig 6.21: Purpose of loan

Table 6.29: Suggestions to reduce the loan burdens of fishers and fish farmers (percentage response)

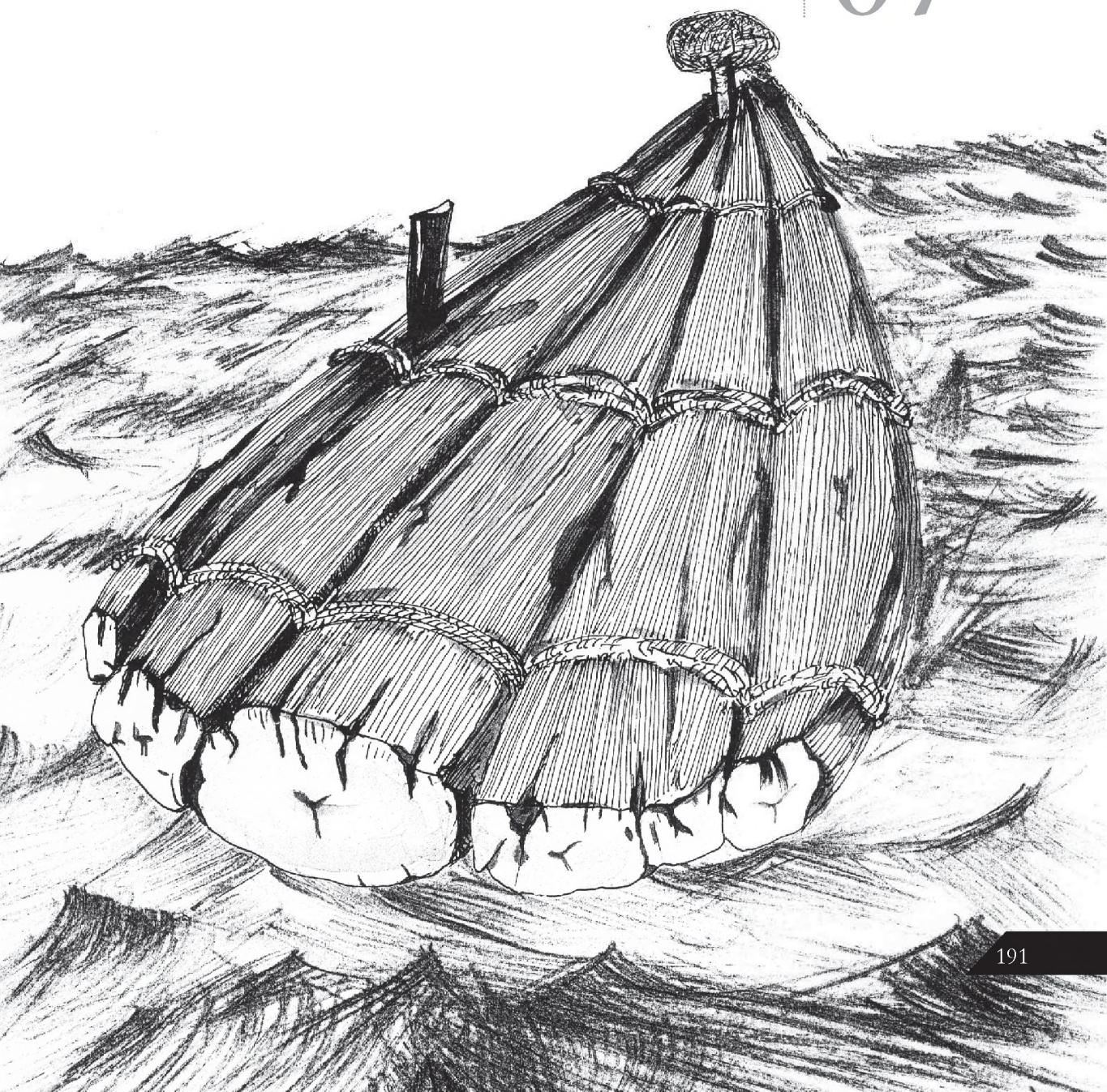
Sl.No	Suggestions	Orissa	Total
1.	Waiver of loan	41.7	20.8
2.	Freeing of interest	36.1	18.1
3.	Provide govt loan	11.1	5.6
4.	More loan by bank	8.3	4.2
5.	Financial support	2.8	1.4

Table 6.30: Suggestions for enhancing the income and employment generation by fishermen (percentage response) in Andhra Pradesh

Sl.No	Suggestions	Percentage Response
1.	Arranging the institutional financial support like micro credit for fisheries, SHG etc	65
2.	Regulation of fish marketing through institutional interventions	15
3.	Vocational training for fisher women to undertake house hold income activities during dry/off season	10
4.	Regulation of PDS and supply of the basic food items and fuel (like kerosene, LPG etc) by the Govt. agencies	10

Brackish Water Aquaculture

07



07

Brackish Water Aquaculture

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About 75 per cent of the world production of farmed shrimp comes from Asian countries; the two leading nations being China and Thailand, closely followed by Vietnam, Indonesia, and India (Table 7.1). The remaining 25 per cent is produced in the western hemisphere, where the South-American countries (Brazil, Ecuador, Mexico) dominate. In terms of export, Thailand is by far the leading nation with a market share of more than 30 per cent, followed by China, Indonesia, and India, accounting each for about 10 per cent. Other major export nations are Vietnam, Bangladesh, and Ecuador. Thailand exports nearly all of its production, while China uses most of its shrimp in the domestic market. The only other major export nation that has a strong domestic market for farmed shrimp is Mexico.

Table 7.1: Aquaculture shrimp production by the major producer nations

Region	Country	1990	91	92	93	94	95	96	97	98	99	2000	01	02	03	04	05	06	07
	China	185	220	207	88	64	78	89	96	130	152	192	267	337	687	814	892	1'080	1'265
	Thailand	115	161	185	223	264	259	238	225	250	274	309	279	264	330	360	401	501	501
	Vietnam	32	36	37	39	45	55	46	45	52	55	90	150	181	232	276	327	349	377
	Indonesia	84	116	120	117	107	121	125	127	97	121	118	129	137	168	218	266	326	315
Asia	India	35	40	47	62	83	70	70	67	83	79	97	103	115	113	118	131	132	108
	Bangladesh	19	20	21	28	29	32	42	48	56	58	59	55	56	56	58	63	65	64
	Philippines	48	47	77	86	91	89	77	41	38	39	41	42	37	37	37	39	40	42
	Myanmar	0	0	0	0	0	1	2	2	2	5	5	6	7	19	30	49	49	48
	Taiwan	15	22	16	10	8	11	13	6	5	5	6	8	10	13	13	13	11	11
	Brazil	2	2	2	2	2	2	3	4	7	16	25	40	60	90	76	63	65	65
	Ecuador	76	105	113	83	89	106	108	133	144	120	50	45	63	77	90	119	150	150
America	Mexico	4	5	8	12	13	16	13	17	24	29	33	48	46	46	62	90	112	114
	U.S.	<1	2	2	3	2	1	1	1	2	2	2	3	4	5	5	4	3	2
Middle	Saudi Arabia	<1	<1	<1	<1	<1	<1	<1	1	2	2	2	4	5	9	9	11	12	15
East	Iran	0	0	<1	<1	<1	<1	<1	<1	1	2	4	8	6	7	9	4	6	3
Oceania	Australia	<1	<1	<1	1	2	2	2	1	1	2	3	3	4	3	4	3	4	3

Scope for brackish water shrimp farming

Global shrimp production as well as trading values and volumes have grown significantly in the past 20 years. The major shrimp producing countries – China, Indonesia, India and Thailand have also experienced substantial increases in recent years. The main shrimp species produced worldwide is white-leg shrimp, *Litopenaeus vannamei* which has replaced the native giant black tiger shrimp, *Penaeus monodon* especially in China and Thailand.

Recently, government of India has given permission to import the species to India. In recent years, production of *P.monodon* declined mainly due to disease problems. The Better Management Practices (BMPs), when well designed and implemented can support producers to increase productivity by reducing risk of shrimp health problems as demonstrated in some farms in Andhra Pradesh by the joint MPEDA/NACA project. The latest development is organic shrimp farming which has already produced good results in some countries. The over exploitation of shrimp from coastal waters and the ever increasing demand for shrimp and shrimp products in the world market has resulted in the wide gap between the demand and supply in the international market. This has necessitated the need for exploring newer avenues for increasing shrimp production. The estimated brackish water area suitable for undertaking shrimp cultivation in India is around 11.91 lakh ha. spread over 10 states and union territories viz. West Bengal, Odisha, Andhra Pradesh, Tamil Nadu, Puducherry, Kerala, Karnataka, Goa, Maharashtra and Gujarat (Table 7.2). Of this only around 1.356 lakh ha are under shrimp farming now and hence lot of scope exists for entrepreneurs to venture into this field of activity. The following table gives the state-wise potential area available for shrimp.

Table 7.2: Potential area for shrimp farming in India

Sl. No.	State	Estimated brackish water area (ha.)
1.	West Bengal	405,000
2.	Odisha	32,600
3.	Andhra Pradesh	150,000
4.	Tamil Nadu	56,000
5.	Puducherry	800
6.	Kerala	65,000
7.	Karnataka	8,000
8.	Goa	18,500
9.	Maharashtra	80,000
10.	Gujarat	376,000
11.	Total	1191900

The potential area for shrimp farming is maximum for West Bengal followed by Gujarat and then by Andhra Pradesh. The state wise area developed, area utilised, production and productivity are given in Table 7.3.

Table 7.3: State wise details of shrimp farming: 2009-10

Sl. No.	State	Area developed (ha)	Area utilized (ha)	Production (MT)	Productivity (MT/ha/Yr)
1.	West Bengal	51,659.00	47,488.00	33,685.00	0.71
2.	Odisha	13,843.00	4,769.00	6,149.00	1.29
3.	Andhra Pradesh	58,145.20	33,754.00	39,537.00	1.17
4.	Tamil Nadu	6,109.33	2,381.49	2,702.38	1.13
5.	Kerala	15,099.39	9,544.84	1,581.00	1.07
6.	Karnataka	3,708.84	1,484.00	1,581.00	0.74
7.	Goa	867.00	272.00	319.00	1.17
8.	Maharashtra	1,329.56	650.86	1,243.79	1.91
9.	Gujarat	2,214.48	1,915.79	3,605.72	1.88
10.	Total	1,52,975.48	1,02,359.98	95,918.89	0.94

The detailed report under brackish water aquaculture for the following states namely Andhra Pradesh, Odisha, Kerala and Tamil Nadu is discussed below:

I. Brackish water aquaculture in Andhra Pradesh

Andhra Pradesh contributes more than half of the country's shrimp production in India. Shrimp farming had started to expand in Kandeleru creek area since 1987-88. Availability of vast tracts of saline lands coupled with abundant quantity of wild seeds and strong export demand for shrimp were initially responsible for attracting the entrepreneurs towards shrimp farming. As a consequent hundreds of hectares of lands were brought under this venture. But the expansion was not smooth which left natural resources around the creek depleted and caused environmental degradation of creek water quality. The sector is facing regular disease problem since 1994. A considerable management and planning is needed for further development (expansion and/or intensification) of this venture.

Area under culture

The state occupies first rank in the country in coastal aquaculture. About 1.50 lakh hectares of potential brackish water area is available in the state for development of coastal aquaculture. By 1995, about 78,700 ha area was developed into ponds for shrimp culture. Due to outbreak of white spot syndrome causing virus in the year 1994 and resultant repeated crop losses during the last 16 years, much of the developed area has fallen fallow and only about 18000 ha area is now under active shrimp culture. The state contribution is about Rs. 3000 crores by way of marine product exports, which is nearly 40 per cent of these exports from India.

Regularization

As per the Coastal Aquaculture Authority Act 2005, enacted by Government of India, it is mandatory for all coastal aquaculture farms (i.e. both new and existing shrimp farms) located within area of 2 km from the High Tide Line (HTL) of the seas, rivers, creeks and back waters has to be registered with Coastal Aquaculture Authority established under the Act. As per the section 14 of the Act, if any person carries on shrimp farming without registering

with Coastal Aquaculture Authority (CAA), he/she shall be punishable with imprisonment for a term which may extend upto three years or fine which may extend upto one lakh rupees, or with both. The provisions of Act have come into effect wef. 16-12-2005.

The Export Inspections Council of India, GOI, New Delhi under section 17 of the Export (Quality, Control and Inspection) Act 1963 (22 of 1963) has issued the notification dated 28-10-2009 to the effect that "the packages of fresh, processed, frozen or chilled and packed aquaculture fish and fishery products bear the registration number allotted by coastal Aquaculture Authority of India/ designated authorities to the farmers from which the aquaculture products are procured." The implication of the above notification is that no exporters can purchase the shrimp from unregistered farm.

Aqua Labs

5 aqua labs are working at Kakinada, Kaikaluru, Bhimavaram, Nellore and Visakhapatnam for disease diagnosis of fish/shrimp and testing water samples etc.

Area of study and sampling frame

Krishna district, Andhra Pradesh (Fig 7.1) was identified as the sample district and a random sample of 100 farmers was drawn in Challapalli and Nagayalankamandals to examine the trends in literacy, income and health of the shrimp farmers.

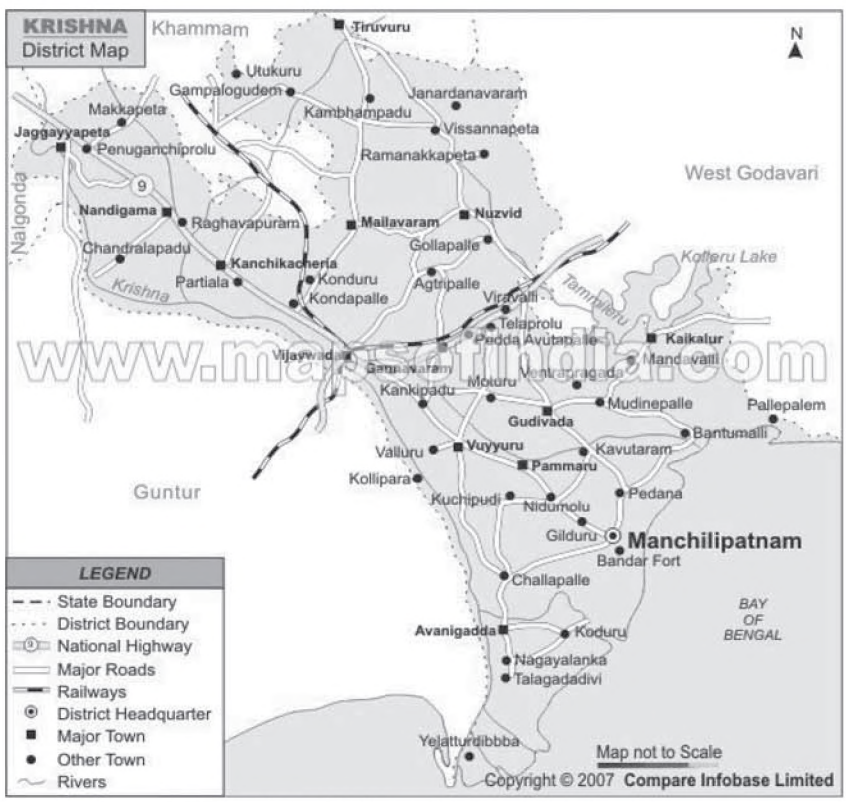


Fig 7.1:Map of Krishna district, Andhra Pradesh

A. General Particulars

(i) Age composition of shrimp farmers:

In Krishna district of Andhra Pradesh, the majority (65 per cent) of the shrimp farmers belonged to the middle age group of 36-55 years. This indicated a healthy trend since farmers of this group are receptive, healthy and industrious. This augurs well for the shrimp farming in Krishna district. Only 17 per cent of the shrimp farmers were in old age group.51 per cent of the respondents in Krishna district were males and 49 per cent were females.

(ii) Family size of shrimp farmers

In Krishna district, the average size of the shrimp farmer family was 4.78. There were 30 families that had an average size of 2-4 members, 37 families with an average size of 5-6 members and 21 families that had a size of 7-10 members.

Given the size of the families and the age groups in which the members fell, the families of the shrimp farmers in Krishna district were in the ideal age group and family composition that could derive optimum development out of shrimp farming in Krishna district.

(iii) Age composition

In Krishna district, a total of 215 males and 206 females were in the sampled families of the 100 shrimp farmers. There were 65 boys and 61 girls who were less than 15 years of age.

B. Literacy Status

(i) Literacy profile

In Krishna district of Andhra Pradesh, among the 421 family members of the 100 sampled shrimp farmers, 192 members (45 per cent) were illiterate. 62 (15 per cent), 137 (33 per cent) and 30 members (7 per cent) were educated upto primary, secondary and collegiate levels respectively.

Table 7.4: Age composition of the respondent households (Number)

District	Adult (> 15 years)		Children < 15 years)		Total	
	Male	Female	Male	Female	Male	Female
Krishna	150	145	65	61	215 (51.07)	206 (48.93)

(ii) Continuing education

No dropouts were recorded among the literate family members of the shrimp farmers in Krishna district. This may be taken as an indication that shrimp farming activity is able to generate levels of income that enables the farmer to educate his family members well.

Table 7.5: Education of respondent households - Continuing and Dropout (Number)

District	Education status			
	Continuing	Primary	Secondary	Collegiate
Krishna	229	62	137	30
	(100.00)	(27.07)	(59.83)	(21.90)

Figures in parenthesis indicate percentage to total (Secondary =High School+ Secondary + Vocational)
Collegiate = Collegiate+ Professional

(iii) Access to educational institutions

Vijayawada is one of the main education centers in Andhra Pradesh. NTR University of Health Sciences is located in Vijayawada. Krishna University is located in Machilipatnam. International Institute of Information Technology is present in Nuzvid. South Indian branch of school of architecture and planning is present in Vijayawada.

It boasts headquarters of numerous residential colleges and schools like Sri Chaitanya, Nalanda, Gowtham, Sri Krishnaveni, and American Medical Education for USMLE coaching which are amongst the biggest/largest of the Corporate Educational Institutes in India. District has numerous engineering colleges including Velagapudi Ramakrishna Siddhartha Engineering College, Gudlavalleru Engineering College, KLCE. Gudlavalleru Polytechnic College, Mary Stella college, Sidhartha Degree College are few of the many famous arts and science colleges in the district.

Machilipatnam, the district headquarters of Krishna, is an educational center, offering all the academic courses except Medicine. It has public (state-run) and private-run schools. The local Hindu college and allied institutions offer KG to PG level of education. There are several Telugu language and English language schools. Daita Madhusudhana Sastry, the former secretary and correspondent of the Hindu college and allied institutions was instrumental in the establishment and expansion of most of the educational institutions in Machilipatnam. Table 7.6 gives the approximate distance of the primary and high schools and colleges from the mandals that were covered under the study in Krishna district.

Table 7.6 : Access to Education (km)

District	Education status			
	Continuing	Primary	Secondary	Collegiate
Krishna	10	20	12	15

Figures in parenthesis indicate percentage to total (Secondary =High School+ Secondary + Vocational)
Collegiate = Collegiate+ Professional

C. Health profile

According to field data collected, it appears that with the eradication of small pox from India, the vaccination for small pox has been discontinued (Table 7.7). The others vaccinations include BCG, MMR, Oral polio vaccines are being given to all the children of the shrimp farmers sampled in Krishna district.

Table 7.7: Vaccination regime of infants / children (less than 15 years)

Districts	Average age of administration and incidence of discontinuation (percentage)									
	Small Pox		BCG		MMR		Polio		Others*	
	Age (Weeks)	IOD*	Age (Weeks)	IOD	Age (Weeks)	IOD	Age (Weeks)	IOD	Age (Weeks)	IOD
Krishna	Nil	Nil	6	Nil	9-12	Nil	6	Nil	9-12	50

*Incidence of discontinuation (IOD) in per cent.

The direct positive co-relationship between education and health consciousness can be seen in Krishna district. No case of discontinuance of the vaccination regime was recorded among the sampled farmers.

(i) Birth weight of infants:

The average birth weight of infants born to shrimp farmers was 2.75 kg in Krishna district. It was 2.50 kg for male infants and 3.0 kg for female infants. The weights compared favourably with the average weight of infants for age weight relationships according to Indian Medical Association estimates.

(ii) Mortality of mother/infant

Details regarding infant and or mother mortality during birth were not available from the shrimp farmers of Krishna district

(iii) Annual occurrence of diseases among shrimp farmers

Shrimp farming has often been alleged to cause skin rashes and even reproductive disorders. But contrary to what has often been reported in popular press during the late nineties, there was no significant incidence of skin or reproductive disorders among shrimp farmers in Krishna district. The frequency of occurrence is insignificant even for normal aliments such as fevers and stomach disorders (Table 7.8). It is significant to note that there are no reports of any serious ailments among shrimp farmers in Krishna district of Andhra Pradesh.

Table 7.8: Incidence of diseases among Adult (Male and Female) - Annual frequency

Sl. No.	Diseases	Krishna District	
		M	F
	Common Diseases		
1.	Fever/Flu	0.45 (45)	0.43 (43)
2.	Body Aches	0.5 (50)	0.49 (49)
3.	Diarrhoea	0.07 (7)	0.02 (2)
4.	Gastro enteric disease	0.41 (41)	0.35 (35)
5.	Skin disorder	0.05 (5)	0.03 (3)
6.	Reproductive disorder	Nil	Nil

	Special Ailments		
7.	Cardiac failure	Nil	Nil
8.	TB	Nil	Nil
9.	Anemia	Nil	Nil
10.	Diabetes	Nil	Nil
11.	Blood Pressure	Nil	Nil
12.	AIDS	Nil	Nil
13.	Others*	Nil	Nil

(iv) Disease occurrence among farmers in shrimp farming (Previous history)

On a recall basis skin diseases were not recorded among women members of shrimp farmers families in Challapalli and Nagayalan kamandals, Krishna district of Andhra Pradesh while only 7 per cent of the male members including children reported any occurrence of skin aliments. The males include boys too. None of the female members of the shrimp farmers' households reported any reproductive disorders even on a 10 year recall basis in the same district among shrimp farmers.

Table 7.9: Incidence of diseases among - Adult (Male and Female) Previous occurrence

Sl. No.	Diseases	Krishna District	
		M	F
	Common Diseases		
1.	Fever/Flu	6.91	7.16
2.	Body Aches	7.41	7.5
3.	Diarrhoea	8.08	8.25
4.	Gastroenteric disease	8.16	8.25
5.	Skin disorder	7.33	Nil
6.	Reproductive disorder	Nil	Nil
7.	Cardiac failure	Nil	Nil
8.	TB	Nil	Nil
9.	Anemia	Nil	Nil
10.	Diabetes	Nil	Nil
11.	Blood Pressure	Nil	Nil
12.	AIDS	Nil	Nil
13.	Others*	Nil	Nil

(others include Thyroid, Sinus)*

(v) Disease occurrence among children of shrimp farmers (Previous history)

Standard birth weights, good diet and normal education have contributed to practical absence of diseases including serious ailments among the children of shrimp farmers in Challapalli and Nagayalankamandals, Krishna district.

On a recall basis practically no minor diseases were recorded among children of shrimp farmers' families in Challapalli and Nagayalan kamandals, Krishna district of Andhra Pradesh even on a 10 year recall basis.

Access to Health care (km)

The sampled mandals of Challapalli and Nagayalankamandals, Krishna district were reasonably close to PHC at Machiliptnam (within 3-6 km), however Vijayawada is having comparatively less access to hospital facilities since it is located 50 km apart. Good health care facilities were available to shrimp farmers of Krishna district.

(vii) Problems in health management

For eliciting responses to problems to health management, among shrimp farmer respondents of Krishna district, an opinion scale of 1 to 5 was offered with 1 indicating total agreement with the statement of reason and 5 in total disagreement. Since good hospitals were accessible to the community at Vijayawada and the local PHC's were being reasonably well manned, most of the responses were towards total disagreement of the possible reasons (Table 7.10).

Table 7.10: Problems in health management

Sl. No.	Reasons	Score
1.	Difficulty in accessing the hospital due to distance	5
2.	Non availability of specialist and para medicines in health centers	5
3.	Poor infrastructure (of PHC)	4
4.	Lack of adequate effective medicines	4
5.	Problems on Cleanliness/ Sanitation	4
6.	Drinking water problem	4
7.	Work related stress	5
8.	Others	5

Scale: 1-5 with 1 indicating total agreement and 5 indicating total disagreement
Number of respondents who had opined on the same

D. Income profile

(i) Income profile

The weekly income of respondents from various economic activities are given in Table 7.11. Incomes were derived from various enterprises like fishery, agriculture, manual labour and other businesses. The weekly average income for Krishna district amounted to Rs. 2019/- per adult.

Table 7. 11. Income profile of the respondents (Weekly Rs.)

Sl. No.	Enterprise	Income in Rs.
1.	Fishery	1153.84
2.	Labour	384.60
3.	Agriculture	384.60
4.	Business	480.760
5.	Any others	-
6.	Total	2019.23

(ii) Involvement of shrimp farmers in non fisheries activities

Krishna district is the heartland of shrimp farming in the country (Table 7.12). Of the 295 adults in 100 shrimp farmer families surveyed, only 62 adults were engaged in activities other than shrimp aquaculture, ie. Only 21 per cent of the total adults in shrimp farming households sampled engaged in other economic activities. This may practically be discounted in full since these activities are seasonal such as working as labour in agriculture during off season time of shrimp farming.

Table 7.12: Respondents involvement in Non-fisheries activities

Sl.No:	Non Fishing activities	Involvement (frequency)
1.	Labour	30
2.	Agriculture	18
3.	Business	05
4.	Any others	09
5.	Total	62 (21)

Figures in parenthesis indicate percentage to total

(iii) Pattern of expenditure of fisher family

The total weekly expenditure of the 100 shrimp families in Challapalli and Nagayalan kamandals, Krishna district of Andhra Pradesh amounted to Rs. 23,500 ie. Rs. 235/- per shrimp farmer family per week. The weekly expenditure seems to be an understatement. The total income was expended with 0.13 per cent on food; 0.22 per cent on clothing; 0.04 per cent on fuel; 0.02 per cent on medicines; 0.53 per cent on education; 0.04 per cent on entertainment and personal 0.04 per cent on durables.

Table 7.13: Pattern of expenditure of the fishers family (Weekly Rs.)

Sl.No.	Items	Expenditure (in Rs.)
1.	Food	3,000
2.	Clothing	5,000
3.	Fuel	1,000
4.	Medical	500
5.	Education	12,000
6.	Entertainment	500
7.	Personal	500
8.	Durables	1000
9.	Total	23,500

(iv) Savings in shrimp farming households

Coastal areas of Andhra Pradesh is one of the richest regions of agricultural India. In tune with the ground truth of the region and the district the data on savings seem to reflect the factual position. Of the 100 farmers sampled in Krishna district 30 per cent did not have any savings; 30 per cent had some savings of less than Rs.50,000; 20 per cent had savings between Rs. 50,000 and 1,00,000 and 10 per cent had savings more than Rs. 1,00,000/-. Moreover no indebtedness was recorded among sampled shrimp farmers in Krishna district

(v) Sources of lending

Though no indebtedness was recorded in Krishna district among the sampled shrimp farmers, as far as crop loan was concerned, the primary source of funds was own funds generated within the family and followed by jewel loans. It does appear that institutional finance is not yet shrimp farming friendly. The short term loans generated through the institutional sources were also taken for minor repair works and not to support the major activity of financing the crop as such. Therefore the risk in shrimp farming is still high and the absence of insurance to accept the enterprise in full appears to be significant.

Table 7.14.: Lending organizations (Number of respondents who had availed)

Sl. No.	Sources	Percentage of respondents
1.	Banks	10
2.	Co-operative	10
3.	Private money lenders	10
4.	Friends / Relatives (and Own)	55
5.	Jewel loans	15

(vi) Purpose of availing loans

In Krishna district, the major purpose for which loans were availed was for meeting short term culture related expenses such as bund repair, motor replacement etc. The other items for which funds were borrowed were for house building and for conducting marriages of children.

Table 7.15: Purpose of availing loans (Percentage of respondents who had availed)

Sl. No.	Purpose	Percentage of respondents
1.	Purchase of craft/ gear and other fishing related equipments	50
2.	House construction / Land purchase	20
3.	Marriage expense	20
4.	Education	Nil
5.	Health and Social Security	Nil
6.	Any others	10

(vii) Scope for enhancement of income and employment

Multiple scoring was used for assessment of suggestions for enhancement of income and employment. Suggestions for formalising the acceptance of shrimp farming by institutional financial agencies and for improving rural infrastructure such as roads and communications had 100 per cent response. At the same time marketing and food security through PDS system was not a problem for shrimp farmers of Krishna district essentially because shrimp farming is a high income earning activity and since it has been practised for the last two decades on a commercial scale in Krishna districts and other districts of Andhra Pradesh.

Table 7.16: Suggestions for enhancing the income and employment generation by fishermen (percentage response)

Sl. No.	Suggestions	Percentage of respondents
1.	Arranging the institutional financial support like micro credit for fisheries, SHG, etc	100
2.	Regulation of fish marketing through institutional interventions	Nil
3.	Vocational training for fisherwomen to undertake house hold income activities during dry/ off season	Nil
4.	Regulation of PDS and supply of the basic food items and fuel(like kerosene ,LPG,etc) by the Govt. agencies	Nil
5.	Provisional of rural infrastructure for general societal / human development	100

II. Brackish water Aquaculture of Odisha

Samplings and Data Collection

Odisha state of India is located between the parallels of 17.49N and 22.34N latitudes and meridians of 81.27E and 87.29E longitudes. It is bounded by the Bay of Bengal on the east; Madhya Pradesh on the west and Andhra Pradesh on the south. It extends over an area of 155,707 square kms accounting about 4.87 of the total area of India. According to the 1991 census, it has a total population of 31,512,070 (3.73 per cent of the total population of India) out of which about 16,237,000 are male and 15,275,070 are female. It has 482 km stretch of coastal line.

The annual per capita fish consumption is 8.44 Kg. During 2007-08 the total fish production of the state is about 2, 25,102 MT. The marine fish production of the state during 2007-08 (up to December, 2007) is about 99553 MT. The state has vast potential for fresh water and brackish water aquaculture. It has fresh water ponds and tanks covering water area of 1,17,913 ha lakes and swamps of 1,80,000 ha, rivers and canals of 1,71,186 ha and reservoirs of 1,97,472 ha. The fishermen population of the state is about 10.84 lakhs. The economic status of the fishermen is generally below the poverty line (BPL). About 80 per cent of the state populations are fish eaters.

The brackish water aquaculture in Odisha is a popular enterprise in the coastal Odisha predominantly in Puri district. Therefore, the data collection on the brackish water aquaculture was concentrated in the Puri district. A total of 59 samples were collected in Odisha. The details of the sampling are presented below.

Samplings and data collection

The results and discussions are presented under the following heads

A. General particulars
B. Literacy status
C. Health status
D. Income status

A. General particulars

The general particulars of respondent's households included age, family size, family composition etc.

(i) Age distribution

The age distribution of respondent households is given in Table 7.17. The brackish water aquaculture sector in the state of Odisha exists mostly in the district of Puri in coastal Odisha. A total of 104 households were surveyed and it was found that majority (about 60 per cent) were in the middle age group of 36 to 55 years and rest of them were mostly at the higher ages i.e. 30.8 per cent above 56 years. The young age group people with less than 35 years were very less constituting 8.7 per cent only.

Table 7.17 : Age wise details of sample respondent (Years)

	Age wise distribution			
	<35	36-55	>56	Total
Frequency	9	63	32	104
Percentage	(8.7)	(60.6)	(30.8)	(100.0)

(ii) Male female ratio

The male female ratio was found to be highly skewed in case of the brackish water aquaculturist of Odisha. There were 294 male against 215 females among the 104 households. This is also indicative of the low level of social status of the women folk and difference in the distribution of the facilities between women and men.

Table 7.18 : Household particulars of the sample respondents-male and female)

District	Number of household	Male	Female	Total
Puri	104	294 (57.8)	215 (42.2)	509 (100)

Figures in parenthesis indicate percentage to total

(iii) Family size

The family size is an important indicator of family welfare. The average size of the family of the brackish water aquaculturist of Odisha were found to be 5.0. About half of them within the size group of 5-6, 40 per cent were within the size group of 2-4 and 10 per cent were in the category of 7-10.

Table 7.19: Family size of the respondent households (Number)

	2-4	5-6	7-10	Total	Average
Number	41	52	11	104	5.0
Percentage	39.4	50.0	10.6	100.0	

(iv) Age composition

The age composition of the respondents' households of the fishers involved in the brackish water Aquaculture of the Odisha shown similar trend comparable to other sector. There was a wide gap between the male and female at 1.4:1 ratio among the adult and 1.24:1 among the children. The adult children ratio was 2.43:1. The skewed male female ratio is a cause of concern for the community.

Table 7.20: Age composition of the respondent households (Number)

	Adult (>15 yr)		Children (<15 yr)		Total	
	Male	Female	Male	Female	Male	Female
Number	226	161	66	53	292	214
Percentage	77.40	75.23	22.60	24.77	100.00	100.00

B. Literacy status

The literacy status of the respondent households was analyzed through the literacy level, educational status - continuing and dropouts and access to educational facilities. The illiterate indicates fisher folk without any formal education and doesn't even possess functional literacy.

Table 7.21: Literacy Profile of the respondent families (Number)

	Total	Illiterates	Literate	Primary	Secondary	College	Profes-sional	Voca-tional
Number	502	79	423	187	188	44	3	1
Percentage	100.0	15.7	84.3	44.2	44.4	10.4	0.7	0.2

(i) Literacy status

The literacy status includes the level of education as indicated by primary, secondary and collegiate level. The primary level indicated schooling till fourth grade, secondary level

indicated by high school. The collegiate level of education was denoted by collegiate and professional education. The vocational education involved any formal education in vocational schools or college.

The fish farmers of the brackish water aquaculture of Odisha were shown relatively better level of education compared to others as only 15.7 per cent of the populace were illiterates. Among the literates about 44 per cent were in primary and the same were in the secondary level. The college level of education was prevalent among 10.4 per cent of the people. Only few members (four) attained professional/vocational qualification among the respondents' families.

(ii) Educational status

The educational status needs to be studied along with the dropout rates as the drop outs were the voluntary or involuntary discontinuation of the education. The drops outs are also the indicators of the termination of the education. Among the brakishwater aquaculturist the dropout rates were as high with 77.0 which was as high as 86.7 per cent in Puri district. The dropouts indicate that most of the students discontinue their education mostly at secondary and primary level. The level of dropouts at secondary level is 42.3 per cent where as at the primary level is 30.9 per cent and rest 26.8 per cent are at the college level. In Puri more dropouts were reported at college level.

The percentages of dropouts among the members of the households involved in the brackish water aquaculture were in Puri as high as 78.7 per cent. Among them the percentage

Farmers involved in brakish water aquaculture

drop outs in the primary, secondary and collegiate level were 27.6 per cent, 52.6 per cent and 19.8 per cent, respectively. About half the dropouts at the level of secondary schools.

Table 7.22: Dropouts at different level of education

	Primary	Secondary	Collegiate	Total drop out	Total literate
Number	92	175	66	333	423
Percentage	27.6	52.6	19.8	100.0	78.7

(iii) Access to educational institutions

Access to education is an important yardstick to measure the socio-economic well being of a society. The proximity of the educational institutions like primary school, high school, college and professional college provides a major impetus when it comes to continuing education. The higher distance to the educational institutes reduces the access to it and there is a greater chance of drop outs when the schools or colleges were distantly located. The analysis was presented to evaluate the physical access to education.

The fish farmers of the brackish water aquaculture located in the Puri district were studied for their physical access to the educational institutions. The average distance to the primary and secondary school were 0.5 and 1.3 kilometers indicated their accessibility. It is also interesting to note that the colleges were also located nearby with an average of 2.5 kilometers. But, the professional colleges were located at a distance of 24.3 kilometers which can be considered as far way in term of the physical access to such institutions.

C. Health profile

The health status of the respondent households was studied based on the parameters like administration of vaccines, incidence of discontinuation, birth weight of infants, incidence of maternal and child mortality at the time of birth, incidence of common diseases and special ailments among adults and children. Disease management aspects like access to health care, problems in health management and suggestions to improve the health care facilities are also dealt in this session.

(i) Vaccination regime and incidence of disease

The average age of administration of vaccination and incidence of discontinuation among infants/children among sample population is studied. The vaccination for Pox, BCG, MMR and Polio were regularly taken by all the families covered under the study. The average age at which the vaccination for pox was given to the child worked out at one year, and for polio it goes upto five years in tune with the practice prevalent and recommendation made by the local hospital and paramedics.

Table 7.23 :Vaccination regime of infants / children (less than 15 years) - Average age of administration and incidence of discontinuation

POX		BCG		MMR		Polio	
Age	IOD*	Age	IOD	Age	IOD	Age	IOD
1	6.4	1	6.4	1	11.1	Upto 5 years	0.0

** incidence of discontinuation in per cent*

The percentage of the household having children received vaccination was studied to assess the spread of the vaccination regimes to the target households. The primary reasons of discontinuation were found to be lack of knowledge and awareness about the programme.

(ii) Birth weight of infants

Birth weights are considered as an important indicator of the health status of the mother and the families. The birth weight in comparison to the state or national average can be an important indicator to access the maternal health status. The birth weights for the male and female in Puri were 2.1 and 2.3 kg, respectively.

(iii) Incidence of mortality among mother/ child during birth

Maternal and child mortality at the time of birth and infant mortality had been pressing concerns over the past. The maternal mortality is an extreme case of the failure of the socio-environmental system to protect the mothers. The incidence of mortality was therefore is an indicator of the health status of the mother and family. Few cases of maternal and child mortality was reported across the sample households in Puri, which include ten cases of child mortality and two incidents of maternal mortality.

(iv) Incidence of diseases among adults

The incidence, frequency, and previous occurrence of diseases among the adult family members of the respondents across the four coastal districts are discussed in the Table 7.24. Major diseases found among the respondents were categorized under two groups, viz; common diseases and special ailments. Fever/flu, body ache, diarrhoea, gastro enteric disease, skin disorder, reproductive disorders are included in common diseases. Special ailments include diseases like cardiac failure, tuberculosis, anaemia, diabetics, blood pressure, AIDS and others. The predominant ailments reported among the fish farmers of brackish water aquaculture were fever, body ache and gastro enteric diseases as a community both in males as well as females. But in all of these cases, the numbers of persons reported as well as frequency of

Table 7.24: Incidence of diseases among Adult (Male and Female) - Annual frequency

Sl.No		Incidence of diseases- Annual frequency			
		Male		Female	
	Common disease	Frequency	Average	Frequency	Average
1.	Fever	103	1.7	96	1.7
2.	Body ache	32	2.4	13	1.9
3.	Diarrhoea	4	2.3	2	1.5
4.	Gastroenteric	36	2.0	25	1.8
5.	Skin disorder	16	1.6	6	1.8
6.	Reproductive disorder	2	1.0	0	0.0
	Special ailments				
7.	TB	2	1.0	0	0.0
8.	Cardiac failure	18	1.1	4	1.0
9	Anaemia	12	1.4	6	1.0
	Others	14	1.6	14	2.1

occurrence were higher in males compared to females. The special ailments were not very predominant in the community.

(v) Incidence of diseases among adult (male and female) previous occurrence

The previous table explained about the reported numbers in each ailments as well as the annual frequency. The common diseases of fever and body ache occurred 3 to 4 months back while for the diarrhoea and skin disorder it was 5-6 months.

Table 7.25: Incidence of diseases among - Adult Previous occurrence (No: of months)

Incidence of diseases- Annual frequency				
	Male		Female	
Common disease	Frequency	Average	Frequency	Average
Fever	103	3.2	96	4.1
Body ache	33	2.4	12	2.5
Diarrhoea	4	3.0	2	5.0
Gastroenteric	36	3.2	25	3.6
Skin disorder	16	3.2	6	5.0
Reproductive disorder	2	6.0	0	0.0
Special ailments				
TB	2	10.5	0	0.0
Cardiac failure	18	6.0	4	5.5
Anaemia	12	4.4	6	4.8
Others	14	4.4	14	4.2

(vi) Incidence of diseases among children

The health status of the children were also studied to make a comparison with adults in terms of both common as well as specialized diseases. The common diseases were mostly fever, body ache, diarrhoea, gastro enteric, skin and reproductive disorder etc. Whereas the specialized diseases were TB, cardiac failure, anaemia and other diseases. Frequencies of diseases in a year across male as well as female child were studied. Across the children in the households of brackish water aquaculturist the predominant disease reported was fever. The occurrence was high in terms of both frequency and number among males and female.

Table 7.26: Incidence of diseases among Children (Male and Female) - Annual frequency

Incidence of diseases- Annual frequency				
	Male		Female	
Common disease	Frequency	Average	Frequency	Average
Fever	26	2.3	23	2.3
Body ache	1	3.0	3	1.0

Diarrhoea	2	2.5	0	0.0
Gastroenteric	0	0.0	0	0.0
Skin disorder	3	1.3	0	0.0
Reproductive disorder	0	0.0	0	0.0
Special ailments				
TB	0	0.0	0	0.0
Cardiac failure	0	0.0	0	0.0
Anaemia	0	0.0	0	0.0
Others	1	1.0	0	0.0

(vii) Incidence of diseases among children (male and female) previous occurrence

The details of previous occurrence of diseases among children in terms of number of month is furnished in table 7.27. As discussed in the previous section, the reported cases of fever and diarrhoea were occurred 2 to 3 months back. Fever was reported 3 to 4 month back among females of respondent households.

Table 7.37: Incidence of diseases among Children - Previous occurrence (No: of months)

	Incidence of diseases- Annual frequency			
	Male		Female	
Common disease	Frequency	Average	Frequency	Average
Fever	26	2.8	23	3.7
Body ache	1	2.0	3	4.0
Diarrhoea	2	2.5	0	0.0
Gastroenteric	0	0.0	0	0.0
Skin disorder	3	4.7	0	0.0
Reproductive disorder	0	0.0	0	0.0
Special ailments	0	0.0	0	0.0
TB	0	0.0	0	0.0
Cardiac failure	0	0.0	0	0.0
Anaemia	0	0.0	0	0.0
Others	1	2.0	0	0.0

(viii) Access to health care

The access to health care is an important indicator of the human development as the accessibility of the health care service determines the state of health of the communities. There are many parameters to measure the access to the health services but among which the physical distance is an important parameter. The physical distance is important as the poor fishing communities in most cases depend heavily on walk or cycle to have access to health care facilities. Therefore, the distance determines the access to the health care in a greater extent. In the present survey, the physical distance in term of kilo meters to the hospital was studied to assess the state of access of the fishers' communities to the health care services.

For the fishers involved in brackish water aquaculture in Puri district the average distance to the hospital was 2.6 kilo meters.

(ix) Problems in health management

Various problems of the health management were investigated in the survey by using open ended questions and each household were asked to identify the most important problem concerned to health management. The table 7.28. depicts the results of the survey.

The major problems in health management identified by the respondents include poor sanitation, poor financial conditions, water problems, as well as poor working conditions etc. Interestingly, no household identified the lack of medical facilities as the problems for them.

Table 7.28: Problems in health management (Frequency)

Sl. No.	Problems	Frequency
1.	Water problem	24 (23.1)
2.	Sanitation	29 (27.9)
3.	Financial problem	26 (25.0)
4.	Poor working condition	25 (24.0)
5.	Lack of medical facilities	0 (0.0)

Figures in parenthesis indicate percentage to total

(x) Suggestions to improve health care

Similar to the survey on the problems, the suggestion to improve the health status was assessed using similar methodology. The fish farmers working in the brackish water aquaculture of Odisha considered availability of free medicines, appointment of knowledgeable staff and provision of water and sanitation facilities as important solution to the problems. .

Table 7.29: Suggestions to improve health care facilities (Frequency)

Sl. No	Suggestions	Frequency
1.	Sanitation facilities by govt.	10 (9.6)
2.	Free medicine by govt.	52 (50.0)
3.	Water facilities by govt.	10 (9.6)
4.	Appointment of knowledgeable staff	31 (29.8)
5.	Appointment of doctors in hospital	1 (1.0)

Figures in parenthesis indicate percentage to total

D. Income profile

The income profiling of the respondent households are analyzed using income patterns, respondents involvement in non fisheries activities and expenditure pattern. In addition the indebtedness and savings were analyzed using details on savings, indebtedness, sources of lending organization, purpose of availing loan and suggestions for enhancing the income and employment generation

(i) Income pattern

Weekly income of the fish farmers engaged in the freshwater aquaculture was assessed using the survey questionnaires. The average income of the people involved in the brackish water aquaculture was reported to be at Rs. 742 per household per week. The aquaculture constitutes about 78.4 per cent of the income followed by agriculture (14.2 per cent). The other incomes like labour, business are of minor importance for the people involved in the brackish water aquaculture.

Table 7.30: Income profile of the respondents (Weekly Rs.)

	Fisheries	Labour	Agriculture	Business	Total
Rupees	581.7	38.5	105.8	22.1	742.3
Percentage	78.4	5.2	14.2	3.0	100.0

(ii) Involvement in non fisheries activities

The Involvement of respondent' households in non fisheries activities are illustrated in Table 7.34. The level of the involvement in other employment sector than fisheries activities was indicative of the livelihood diversity. It is generally understood that the diversified portfolio of the income is a sign of livelihood security as it reduces the seasonality and increases the adaptability to the risk and uncertainty in the livelihoods. About 31.7 per cent of the households were depending on agriculture activities as an alternative source if income.

Table 7.31: Respondents involvement in Non-fisheries activities

	Labour	Agriculture	Business	Total
Frequency	15	33	5	104
Percentage	14.4	31.7	4.8	100.0

(iii) Expenditure patterns

The expenditure is considered to be the most important indicators of the income and poverty as the income data alone are often unreliable. The expenditure pattern not only shows the net expenditure but also the qualitative information of the expenditure across various heads. The important expenditure heads of a family including food, clothing, fuel, education, medical expenses, entertainment, durables, personal etc were studied. The fish farmers of brackish water aquaculture were spending about 60.0 per cent for food followed by personal (9.2 per cent) medical (6.9 per cent) and clothing's (6.4 per cent) together constitute about 82. 3 per cent. The personal expenses were primarily for the consumption of liquors, tobacco and other intoxicants.

Table 7.32: Pattern of expenditure of the fisher families (Weekly Rs.)

	Food	Clothing	Fuel	Medical	Education	Entertain-ment	Personal	Durable	Total
Rupees	383.5	40.9	22.7	44.3	34.7	37.6	58.6	17.1	639.3
percentage	60.0	6.4	3.5	6.9	5.4	5.9	9.2	2.7	100.0

(iv) Indebtedness and Savings

The indebtedness and loan details are important to understand the level of distress within the household of the fish farmers and fishers involved in the fisheries and aquaculture. The frequency occurrence of the loans were studied and presented in table 7.33 Most of the brackish water aquaculturists was taken loan. About one third of the fish farmers were taken loan of varying amount viz., <1000, 1000-10000, 10000-50000. Only a few were taken higher amount of loan (>50000).

Table 7.33 : Loan details of respondent households

	<1000	1000-10000	10000-50000	50000-100000	>100000	Total
Frequency	28	28	30	3	1	90
Percentage	31.1	31.1	33.3	3.3	1.1	100.0

The number of person having loan is an indicator of the financial independence of the community as higher percentage of the loan would be indicating the loan dependency. Similarly, the actual amount of the loan per household was indicative of the community dependence. The loan amount was indicative of the actual level of dependence to the credit. The loan per loaning household shows the individual household dependence where as the per household indicates the community financial health. Among the brackish water aquaculturists of Odisha, most of them (86.5 per cent) were involved in the loan of any amount. The average loan amount was Rs. 4566.7 and per household it was estimated to be Rs. 3951.9. These amounts were used mostly for consumption as well as operational expenses for aquaculture.

(v) Source of lendings

There were many sources of the lending viz., banks, private moneylenders, friends, self-help group, private company, cooperative society and cooperative bank. These sources were diverse with differential institutional arrangement in supply of the credit to the fishers. The private money lenders and friends were the informal sources where as others were the formal sources in the credit supply. The table 7.34 presents the percentage distribution of the loans across the sources. The fish farmers of brackish water aquaculture of Odisha were taken loan primarily from banks, cooperative Society and cooperative bank in the order of importance. Other sources were less important as sources of credit.

Table 7.34:Sources of lending (Number of respondents who had availed)

	Bank	Private money lenders	Friends	Self Help Group	Cooperative society	Cooperative bank
Frequency	27	3	3	3	17	9
Percentage	43.5	4.8	4.8	4.8	27.4	14.5

(vi) Purpose of loan

In the preceding sections the amount as well as sources of the credits was studied. It was found that the fish farmers and fishers were mostly taken smaller amounts of the credit. The Table 7.35 presents the purpose of the credit across various uses distributed in percentages. The most prioritized purpose of the loan was business, agriculture and construction of houses for the brackish water aquaculturists of Odisha.

Table 7.35: Purpose of availing loans (Number of respondents who had availed)

Sl.No.	Purpose	Frequency
1.	Construction of house	8 (13.8)
2.	Agriculture	15 (25.9)
3.	Digging and repair of pond	0 (0.00)
4.	Health management	2 (3.4)
5.	Fishing equipment	0 (0.00)
6.	Business	34 (57.9)

Figures in parenthesis indicate percentage to total

(vii) Suggestions to improve indebtedness

The survey sought open ended suggestions from the respondent about the options to reduce the loan burden. The suggestions are presented in Table 7.36 as percentage response to the various options. The government support, freeing of interest were the two major suggestion followed by the loan weaver as options to reduce the loan burden of brackish water aquaculturists.

Table 7.36: Suggestions to reduce the loan burdens of fish farmers.

Sl.No.	Purpose	Frequency
1.	Loan weaver	11 (18.6)
2.	Interest free loan	19 (32.2)
3.	Provide government loan	2 (3.2)
4.	More loan by bank	1 (1.7)
5.	Government support	26 (44.1)

Figures in parenthesis indicate percentage to total

III. Brackish water aquaculture - Kerala

Brackish water aquaculture contributes significantly to the Indian sea food export, mainly through production of shrimp and scampi. Among the coastal districts in Kerala, four districts namely Alapuzha, Ernakulam, Thrissur and Kollam are contributing significantly to the brackish water aquaculture production from the state and are selected for the study. The assessment of literacy, health and income status of the fish farmers in these four districts are presented below:-

A. General particulars

(i) Age

The analysis of the age group of the respondents indicated that the maximum proportions of them are in the age group of 36-55 years (58per cent of the total) (Table 7.37). Among the four districts also, the highest share of respondents fall under the age group of 36-55 years (48 per cent in Alapuzha, 35.82per cent in Ernakulam, 55per cent in Kollam and 65per cent in Thrissur). This indicated that the potential (or receptive or experienced) age group range of 36-55 years dominates the age group composition, which can be considered ideal for introducing any new concepts in the field.

Table 7.37: Age wise details of the sample respondents (Years)

Sl. No	Districts	<35	36-55	>56	Total
1.	Alappuzha	8 (32.00)	12 (48.00)	5 (20.00)	25 (100.00)
2.	Ernakulam	2 (5.71)	22 (35.82)	11 (31.42)	35 (100.00)
3.	Kollam	2 (10.00)	11 (55.00)	7 (35.00)	20 (100.00)
4.	Thrissur	1 (5.00)	13 (65.00)	6 (30.00)	20 (100.00)
5.	Total	13 (13.00)	58 (58.00)	29 (29.00)	100 (100.00)

Figures in parenthesis indicate percentage to total

(ii) Family composition

In the sample households, are of 433 members, 227 were male (52.42per cent), and 206 (47.57per cent) – Table 7.38.

Except in Thrissur, the populations of male members were higher than that of female members in the other three districts. In Thrissur district, the number of female in the respondents' household shared 52.94 per cent of the total number of respondents against the share of 47.05per cent of male respondents.

Table 7.38: Household particulars of the sample respondents –male and female (Number)

Sl.No.	Districts	Households	Male	Female	Total
1.	Alappuzha	25	59 (56.19)	46 (43.80)	105 (100.00)
2.	Ernakulam	35	80 (51.61)	75 (48.38)	155 (100.00)
3.	Kollam	20	48 (54.54)	40 (45.45)	88 (100.00)
4.	Thrissur	20	40 (47.05)	45 (52.94)	85 (100.00)
5.	Total	100	227 (52.42)	206 (47.57)	433 (100.00)

Figures in parenthesis indicate percentage to total

(iii) Family size

The average family size of the respondents' household is 4.33, marginally lower than the national fishers' households family size of 4.5 (CMFRI, 2006) (Table 7.39). This indicated the comparatively successful implementation of the small family norms of the state government. Kerala model of population is widely recognized by the other States.

The maximum proportion of the households is under the family size group of 2-4 (66per cent). In all the four districts, the proportion of households under this family size group is the highest. Only 27per cent of the respondents had a bigger family size group of 5-6. This can be due to the fact that, presently most of the size families are under nuclear family type and very little proportion lives as joint family.

Table 7.39: Family size of the respondent households (Number)

Sl No.	Districts	Family Size					Total	Average
		1	2-4	5-6	7-10	>10		
1.	Alappuzha	-	17 (68.00)	8 (32.00)	-	-	25 (100.00)	4.20
2.	Ernakulam	-	21 (60.00)	12 (34.28)	1 (2.85)	1 (2.85)	35 (100.00)	4.42
3.	Kollam	1 (5.00)	13 (65.00)	2 (10.00)	4 (20.00)	-	20 (100.00)	4.40
4.	Thrissur	-	15 (75.00)	5 (25.00)	-	-	20 (100.00)	4.25
5.	Total	1 (10.00)	66 (66.00)	27 (27.00)	5 (5.00)	1 (1.00)	100 (100.00)	4.33

Figures in parenthesis indicate percentage to total

(iv) Age composition

The analysis of the age composition of the respondent households indicated that, in adult group (more than 15 years) male members were marginally higher than the female members both in relative terms and in terms of percentage composition, while it was reverse in case of children (Table 7.40).

Table 7.40: Age composition of the respondent households (Number)

Sl No.	Districts	Adult (> 15 years)		Children < 15 years)		Total	
		Male	Female	Male	Female	Male	Female
1.	Alappuzha	47 (79.66)	37 (80.43)	12 (20.33)	9 (19.56)	59 (100.00)	46 (100.00)
2.	Ernakulam	71 (88.75)	63 (84.00)	9 (11.25)	12 (16.00)	80 (100.00)	75 (100.00)
3.	Kollam	43 (89.58)	35 (87.50)	5 (10.41)	5 (12.50)	48 (100.00)	40 (100.00)
4.	Thrissur	35 (87.50)	41 (91.11)	5 (12.50)	4 (8.88)	40 (100.00)	45 (100.00)
5.	Total	196 (86.34)	176 (85.43)	31 (13.65)	30 (14.56)	227 (100.00)	206 (100.00)

Figures in parenthesis indicate percentage to total

Adult- children Ratio:-

Alappuzha - Adult - 84 (80per cent), Children - 21 (20per cent)
Ernakulam - Adult - 134 (86.45per cent), Children - 21 (13.54per cent)
Kollam - Adult - 78 (88.63per cent), Children - 10 (11.36per cent)
Thrissur - Adult - 76 (89.41per cent), Children - 9 (10.58per cent)

B. Educational Status

(i) Literacy profile

Kerala is the state with highest literacy rate. Literacy is an important indicator of an individual's development. The overall literacy rate was 95.15 per cent which is higher than the

literacy level of the state (2001 census). The high rate of literacy is being due to the effective implementation of the education development programmes in the state. (Table 7.41).

Among the literates, the maximum proportion of family members, 75.24 per cent was educated up to secondary level, followed by primary level (12.69 per cent) and collegiate level (12.13 per cent).

Table 7.41. : Literacy profile of the respondent families (Number)

Sl. No.	Districts	Total	Illiterate	Literate	Primary Level	Secondary Level	Collegiate Level
1.	Alappuzha	105	1	103	5 (4.85)	85 (82.52)	13 (12.62)
2.	Ernakulam	155	5	146	21 (14.38)	108 (73.97)	17 (11.64)
3.	Kollam	88	1	83	15 (18.07)	57 (68.67)	11 (13.25)
4.	Thrissur	85	5	80	11 (13.75)	60 (75.00)	9 (11.25)
5.	Total	433	12	412	52 (12.69)	310 (75.24)	50 (12.13)

Figures in parenthesis indicate percentage to total literate population
(Secondary Level =High School+ Secondary + Vocational, Collegiate Level = Collegiate+ Professional)

(ii) Educational status

Among the family members of the household, 109 members are continuing studies, while 317 members dropped out at different stages (Table 7.42). Out of those who dropped out, 40 (12.61 per cent) dropped out at primary level, 257 (81 per cent), at secondary level and 20 (6.30 per cent), at college level. The high rate of drop outs is a matter of serious concern, which needs proper attention.

Table 7.42: Education of respondent households - Continuing and Dropout (Number)

Sl.No.	Districts	Continuing	Drop outs			
			Primary	Secondary	Collegiate	Total
1.	Alappuzha	30	2 (2.70)	69 (93.24)	3 (4.05)	74 (100.00)
2.	Ernakulam	32	18 (15.12)	94 (78.99)	7 (5.88)	119 (100.00)
3.	Kollam	24	10 (16.12)	46 (74.19)	6 (9.67)	62 (100.00)
4.	Thrissur	23	10 (16.12)	48 (77.41)	4 (6.45)	62 (100.00)
5.	Total	109	40 (12.61)	257 (81.00)	20 (6.30)	317 (100.00)

Figures in parenthesis indicate percentage to total

(iii) Access to education

The access to education was measured or evaluated by calculating the distance of the educational institutions from the respondents house (Table 7.43). It is seen from the table that a member should travel an average distance of 1.16 km to get primary education; about 2.78 km to get high school education; 12.58 km for college education and 11.86 km for professional college studies.

The analysis indicated that,. Alappuzha district is comparatively better placed than the other three districts in providing educational facilities to the fishers' household.

Table 7.43: Access to education (km)

Sl. No.	Districts	Primary School	High School	College	Professional College
1.	Alappuzha	1.06	1.30	5.12	8.16
2.	Ernakulam	1.47	2.28	15.25	12.87
3.	Kollam	1.15	5.10	23.90	16.05
4.	Thrissur	0.97	2.47	6.07	10.37
5.	Average	1.16	2.78	12.58	11.86

C. Health profile

The vaccination regime indicated that the children in all the sample districts have been administered the vaccines at the prescribed age limit and the percentage of discontinuance is zero. (Table 7.44) This indicated the effective functioning of public health facilities in the districts.

Government of India takes adequate steps to maintain and improve child health. The children of the fisher's household were vaccinated as per schedule and there is no rate of discontinuance.

Table 7.44: Vaccination regime of infants / children (less than 15 years)
Average age of administration and incidence of discontinuation (percentage)

Sl. No.	Districts	Pox		BCG		MMR		Polio	
		Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)
1.	Alappuzha	1.00	0.00	0.10	0.00	1.00	0.00	4.50	0.00
2.	Ernakulam	0.80	0.00	0.25	0.00	1.50	0.00	3.28	0.00
3.	Kollam	-	0.00	0.23	0.00	0.97	0.00	4.11	0.00
4.	Thrissur	-	0.00	-	0.00	-	0.00	5.00	0.00
5.	Average	0.70	0.00	0.14	0.00	0.86	0.00	4.22	0.00

Normally Polio administration continues till the age of 5 years
Figures in percentage indicate Incidence of discontinuation (IOD)

(i) Birth weight of the infants

The average birth weight of the infant was 2.94 kg (Table 7.45). The average birth weight of the male child is (2.95 kg) was marginally higher than the female child (2.93 kg). (Table 7.48) A similar trend was observed in three districts except Kollam where the birth weight of female child (3.16 kg) was higher than that of the male child (2.56 kg). However the average birth weight of the child was 2.94 kg, which was lower than the states/national average

Table 7.45. Birth weight of infants (kg)

Sl.No.	Districts	Weight (kg)		
		Male	Female	Total
1.	Alappuzha	3.63	3.33	3.48
2.	Ernakulam	2.83	2.72	2.77
3.	Kollam	2.56	3.16	2.86
4.	Thrissur	2.68	2.53	2.60
5.	Average	2.95	2.93	2.94

(ii) Incidence of mortality among mother/child during birth

There has been no incidence of mortality of mother or child during the birth in the sample households in all the districts except for a case of one death in Ernakulam, which is due to premature delivery (Table 7.46). This can be due to the different health schemes of the state governments and the committed execution of the schemes. The Government of India has launched a new scheme during 2009 called Navajata Shishu Suraksha Karyakram, to reduce the IMR by providing training to health care providers. (The Hindu, 8.11.09, Kochi Edn, AartiDhar, p. 10).

Table 7.46: Incidence of maternal and child mortality

Sl. No:	Districts	No. of delivery	Maternal mortality		Child mortality		Total
			Number	Reason	Number	Reason	
1.	Alappuzha	-	Nil	Nil	Nil	Nil	Nil
2.	Ernakulam	5	Nil	Nil	1	Premature delivery	1
3.	Kollam	2	Nil	Nil	Nil	Nil	Nil
4.	Thrissur	-	Nil	Nil	Nil	Nil	Nil
5.	Total	7	Nil	Nil	1	Nil	1

(iii) Incidence of disease among adults

Fever and flue has been the common disease that had affected the adult (male and female) fisher households with an annual frequency of more than one. (Table 7.47).Male members of the family were affected by fever and flue more times than the female members. Body ache was the next disease that affected the population both male and female.

Under the special ailments, cardiac failure was one of the major disease that affected the population with one incident. There is no significant difference among the four districts in the incidence of special ailments.

Table 7.47: Incidence of diseases among Adult (Male and Female) - Annual frequency

Sl. No:	Diseases	Districts									
		Alappuzha		Ernakulam		Kollam		Thrissur		Total	
		M	F	M	F	M	F	M	F	M	F
	Common Diseases										
1.	Fever/Flu	3.48 (25)	2.12 (25)	2.53 (13)	1.33 (9)	3.10 (10)	3.61 (13)	1.66 (18)	1.35 (14)	2.69 (66)	2.10 (61)
2.	Body Aches	1.86 (23)	1.78 (23)	2.60 (5)	1.20 (5)	Nil	9.00 (2)	1.20 (10)	1.00 (9)	1.41 (38)	3.24 (39)
3.	Diarrhoea	1.00 (2)	1.00 (2)	1.33 (3)	Nil	Nil	Nil	1.00 (2)	1.00 (4)	0.83 (7)	0.50 (9)
4.	Gastroenteric disease	2.04 (23)	1.47 (23)	1.00 (1)	Nil	Nil	Nil	1.00 (2)	Nil	1.01 (26)	0.36 (23)
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

6.	Reproductive disorder	Nil	Nil	Nil	1.00 (1)	4.00 (3)	6.50 (2)	Nil	Nil	1.00 (3)	1.87 (3)
	Special Ailments										
7.	Cardiac failure	1.00 (1)	Nil	1.00 (1)	Nil	Nil	Nil	1.00 (1)	1.00 (1)	0.75 (3)	0.25 (1)
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	2.00 (1)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.50 (1)

Figures in parenthesis indicate the number of incidence in families,
(others include Thyroid, Sinus)*

(iv) Incidence of disease among adult male and female previous occurrence

Among the common diseases the previous occurrence was high in case of fever and flue which had occurred 1.85 and 1.58 months earlier. (Table 7.48). In case of males body pain had a previous occurrence of 1.79 months and the female got body pain more frequently than males at 0.99 months. Diarrhoea is the most frequently affected disease which has recurred in a period of 1.06 months among male and 0.56 months among female respondents. Among the four districts, the fishers of Ernakulam and Thrissur were more frequently affected by the common ailments than fishers of the other two districts

In case of special ailments, cardiac failure was the important disease that had recurred within a period of 3.75 months. The fishers of Alapuzha and Thrissur had the recurrence of cardiac failure.

Table 7.48: Incidence of diseases among adults (Male and Female)
Previous occurrence (No: of months)

Sl. No:	Diseases	Districts									
		Alappuzha		Ernakulam		Kollam		Thrissur		Total	
		M	F	M	F	M	F	M	F	M	F
	Common Diseases										
1.	Fever/Flu	2.08	1.64	1.23	1.33	3.00	2.38	1.11	1.00	1.85	1.58
2.	Body Aches	1.86	1.39	1.80	1.20	Nil	1.00	1.40	1.33	1.79	0.99
3.	Diarrhoea	1.00	1.00	2.75	Nil	Nil	Nil	1.50	1.25	1.06	0.56
4.	Gastroenteric disease	1.60	1.26	5.00	Nil	Nil	Nil	2.50	1.00	2.27	0.56
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6.	Reproductive disorder	Nil	Nil	Nil	6.00	3.00	1.00	Nil	Nil	0.75	1.75

	Special Ailments										
7.	Cardiac failure	8.00	Nil	4.00	Nil	Nil	Nil	3.00	1.00	3.75	0.25
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	2.00	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.50

(Others include Thyroid, Sinus)*

(v) Incidences of diseases among children

The annual frequency of diseases occurring in male and female children is presented in Table 7.49. It is seen from the table that, fever/flue, body aches and diarrhoea are the common ailments that affect the children in the two districts. The frequency of fever among male and female children was the highest in Kollam (7.57 times and 2.75 per year) than other three districts. A total of 72 children were affected by fever /flue. The other ailments like diarrhoea and body ache was found to affect the children in comparatively a lesser frequency.

Table 7.49: Incidence of diseases among children (Male and Female) - Annual frequency

Sl. No:	Diseases	Districts									
		Alappuzha		Ernakulam		Kollam		Thrissur		Total	
		M	F	M	F	M	F	M	F	M	F
	Common Diseases										
1.	Fever/Flu	2.50 (10)	2.22 (9)	1.57 (7)	1.00 (2)	7.57 (7)	2.75 (4)	1.52 (17)	1.06 (16)	3.29 (41)	1.75 (31)
2.	Body Aches	Nil	Nil	Nil	1.00 (1)	Nil	Nil	1.00 (3)	1.00 (2)	0.25 (3)	0.50 (3)
3.	Diarrhoea	2.15 (8)	1.66 (9)	Nil	Nil	10.00 (2)	Nil	1.33 (3)	1.00 (2)	3.37 (13)	0.66 (11)
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil	1.00 (1)	1.00 (3)	0.25 (1)	0.25 (3)
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	Special Ailments										
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Figures in parenthesis indicate the number of incidence in families,
(Others include Thyroid, Sinus)*

(vi) Incidence of disease among children: previous occurrence

Apart from the frequency of occurrence of ailments, their immediate previous occurrence was also recorded and presented in Table 7.50 . It is seen from the table that, fever & flue occurred on an average of 1.42 months ago among male children and 1.91 months ago among female children in the selected centres.

The recurrence of other common ailments like body aches and diarrhoea one month and gastro-enteric disorder (1.0 month earlier in males & 1.33 months ago in female) were noticed in Thrissur district.

Table 7.50:Incidence of diseases among Children (Male and Female) - Previous occurrence (No: of months)

Sl. No:	Diseases	Districts									
		Alappuzha		Ernakulam		Kollam		Thrissur		Total	
		M	F	M	F	M	F	M	F	M	F
	Common Diseases										
1.	Fever/Flu	1.40	1.66	1.14	2.00	1.85	2.25	1.29	1.75	1.42	1.91
2.	Body Aches	Nil	Nil	Nil	3.00	Nil	Nil	1.00	1.00	0.25	1.00
3.	Diarrhoea	1.75	1.38	Nil	Nil	Nil	Nil	1.00	1.50	0.68	0.72
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil	1.00	1.33	0.25	0.33
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	Special Ailments										
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

(Others include Thyroid, Sinus)*

(vii) Access to health care

Access to health care is an important component of disease management, which decides the time within which medical care is available to the patient. The average distance of the primary health centre (PHC) is 2.43 and hospital is 7.48 km in the study area (Table 7.51). However the hospitals are comparatively far off than the PHC in all the four selected districts. The maximum distance for the nearest hospital was in Kollam district (16.67km) and the minimum distance was in Ernakulam (3.04 km).

Table 7.51: Access to health care (km)

Sl. No.	Districts	Primary Health Centre	Hospital
1.	Alappuzha	2.64	6.12
2.	Ernakulam	1.26	3.04
3.	Kollam	1.75	16.67
4.	Thrissur	4.10	4.10
5.	Average	2.43	7.48

(viii) Problems in health management

The respondent's opinion on problems of health management was analyzed. It was found that drinking water problems (33 per cent of the respondents) , difficulty in accessing the hospital due to distance (30 per cent), poor infrastructure (29 per cent), non availability of specialist and para medicines in health centres (28 per cent) and problem on cleanliness sanitation (20 per cent) were cited as the serious problems in health management by the respondents. (Table 7.52). It is thus concluded that the basic requirements of good, potable drinking water, hygienic sanitation facilities and minimum medical facilities are still required in the study area.

Table 7.52: Problems in health management

Sl. No.	Problems	Districts				
		Alappuzha	Ernakulam	Kollam	Thrissur	Total
1.	Difficulty in accessing the hospital due to distance	3				3
2.	Non availability of specialist and para medicines in health centers		8	17	3	28
3.	Poor infrastructure		2	15	12	29
4.	Lack of adequate effective medicines		2		2	4
5.	Problems on Cleanliness/ Sanitation	12			8	20
6.	Drinking water problem	23			10	33

(ix) Suggestions to improve health care facilities

Providing good quality drinking water (20% of total respondents) and increasing the number of doctors/specialists (20%) have been cited as the important suggestion for good health care by highest number of respondents (Table 7.53). Constructing modern hospital with all infrastructure and health care facilities (18%) and making available sufficient life saving medicines (15%) were ranked third and fourth suggestions for improvement of health care.

Table 7.53 :Suggestions to improve health care facilities (Frequency)

Sl. No.	Suggestions	Districts				
		Alap-puzha	Ernaku-lam	Kollam	Thris-sur	Total
1.	Increase the number of doctors/ specialists	3 (12.00)	2 (5.71)	15 (75.00)		20 (20.00)
2.	Make quarters facility for doctors so that they are available 24 x 7	5 (20.00)	2 (5.71)			7 (7.00)
3.	Make available sufficient medicines for all diseases with free of cost		5 (14.28)		10 (50.00)	15 (15.00)
4.	Construct the modern hospital with all infrastructure and health care facilities.		8 (22.85)		10 (50.00)	18 (18.00)
5.	Provide ambulance for emergency (especially during delivery accidents, etc.)					
6.	Need good drinking water facility	20 (80.00)				20 (20.00)

Figures in parenthesis indicate percentage to total respondents

D. Income profile

(i) Income and expenditure pattern

The average weekly income per household worked out to Rs. 1284.50 out of which 58.55per cent (Rs.752.09) is from fisheries followed by business – 16.34per cent (Rs. 210) and other services – 10.41per cent (Rs.134.12) (Table 7.54). The income from agriculture was Rs.95.56 (7.43per cent) and labour wages were Rs.92.67 (7.41per cent). Fisheries are the major source of income, which accounted for more than 50per cent of the total income in all the districts except at Kollam, wherein its share was 21.52 per cent.). The analysis of income pattern indicated that the dependency on fisheries is higher in all the districts but the other sources also provided a substantial support so that a lean income in fisheries is compensated by the income from other sources.

Table 7.54 : Income profile of the respondents (Weekly Rs.)

Sl. No.	Districts	Districts					
		Fishery	La-bour	Agriculture	Business	Any others	Total
1.	Alappuzha	1214.00 (63.42)		84.00 (9.61)	310.00 (16.91)	306.00 (15.98)	1914.00 (100.00)
2.	Ernakulam	807.62 (71.02)	195.71 (17.21)	78.25 (6.88)		55.48 (4.87)	1137.08 (100.00)
3.	Kollam	301.75 (21.52)	175.00 (12.84)	220.00 (15.69)	530.00 (37.80)	175.00 (12.48)	1401.75 (100.00)
4.	Thrissur	685.00 (100.00)					685.00 (100.00)
5.	Total	752.09 (58.55)	92.67 (7.21)	95.56 (7.43)	210.00 (16.34)	134.12 (10.41)	1284.50 (100.00)

Figures in parenthesis indicate percentage to total

(ii) Employment in non-fisheries activities

The employment of respondents in non fishery activities was higher in Alapuzha (21 persons: 84per cent of total respondents involved in non fishery activities) and Kollam (17 persons, 85per cent). (Table 7.55)

Table 7.55: Respondents involvement in non-fisheries activities

Sl. No.	Districts	Districts				
		Labour	Agriculture	Business	Any others	Total
1.	Alappuzha		7 (28.00)	3 (12.00)	11 (44.00)	21 (84.00)
2.	Ernakulam	4 (11.42)	3 (8.57)		2 (5.71)	9 (25.71)
3.	Kollam	4 (20.00)	5 (25.00)	7 (35.00)	1 (5.00)	17 (85.00)
4.	Thrissur					
5.	Total	8 (8.00)	15 (15.00)	10 (10.00)	14 (14.00)	47 (47.00)

Figures in parenthesis indicate percentage to total

(iii) Expenditure pattern

The analysis of the expenditure pattern revealed that, food is the major source of expenditure of the fishers' household accounting for 50.72 per cent of the total expenses followed by education (13.67per cent), fuel (7.87per cent), medicines (7.21per cent) and clothing (6.66per cent) (Table 7.56). In all the four districts the percentage of income spent on food accounted for the maximum share of their respective total expenditures. This confirms Engels' law of standard of living which says that the percentage of income spent on food is the highest in low income groups and the per cent share declines as the income increases – through the actual amount spent on food increases.

Table 7.56 :Pattern of expenditure of the fisher family (Weekly)

Sl. No.	Districts	Items								
		Food	Clothing	Fuel	Medical	Educa-tion	Enter-tainment	Per-sonal	Dura-bles	Total
1.	Alappuzha	796.00 (52.99)	60.20 (4.01)	42.32 (2.82)	66.40 (4.42)	84.00 (5.59)	16.00 (1.07)	287.00 (19.11)	150.20 (9.99)	1502.12 (100.00)
2.	Ernakulam	393.42 (38.97)	125.28 (12.41)	153.47 (15.20)	81.00 (8.02)	181.54 (17.98)	24.40 (2.41)	16.71 (1.65)	33.62 (3.33)	1009.47 (100.00)
3.	Kollam	650.00 (52.93)	64.00 (5.21)	68.25 (5.55)	148.20 (12.06)	297.50 (24.22)				1227.95 (100.00)
4.	Thrissur	258.75 (65.25)	26.12 (6.58)	61.75 (15.57)	2.75 (0.69)	2.50 (0.63)	0.75 (0.18)	32.00 (8.07)	11.87 (2.99)	396.50 (100.00)
5.	Average	524.54 (50.72)	68.90 (6.66)	81.44 (7.87)	74.58 (7.21)	141.39 (13.67)	10.28 (0.99)	83.29 (8.05)	48.92 (4.73)	1034.00 (100.00)

Figures in parenthesis indicate percentage to total

(iv) Indebtedness and savings

The analysis of the saving pattern indicated that, 59 per cent of the respondents had no savings, 40 per cent had savings less than 50,000 and one per cent between 50,000 and one lakh (Table 7.57).

Table 7.57: Savings details of respondent households

Sl. No.	Districts	Frequency of respondents having Savings			Total
		Nil	< 50 k	50-100 k	
1.	Alappuzha	1 (5.00)	24 (95.00)		25 (100.00)
2.	Ernakulam	29 (82.85)	5 (14.28)	1 (2.85)	35 (100.00)
3.	Kollam	9 (45.00)	11 (55.00)		20 (100.00)
4.	Thrissur	20 (10.00)			20 (100.00)
5.	Total	59 (59.00)	40 (40.00)	1 (1.00)	100 (100.00)

The average indebtedness per person worked out to Rs. 85,677.67 and the average amount repaid worked out at Rs.17, 697.12 (Table 7.58). The number of persons indebted was the highest in Ernakulam – 27 persons (77.14 per cent of total respondents).

Table 7.58: Indebtedness of the sample respondents

Sl. No.	Districts	Indebtedness		
		Number of persons	Average Amount per person	Average Amount repaid
1.	Alappuzha	22 (88.00)	43500.00	10875.00
2.	Ernakulam	27 (77.14)	150085.71	19418.51
3.	Kollam	13 (65.00)	123800.00	34185.00
4.	Thrissur	19 (9.50)	25325.00	6310.00
5.	Total	81 (81.00)	85677.67	17697.12

Figures in parenthesis indicate percentage to total

(v) Sources of lending

Among the different sources of advancing loans, co-operatives contributed to the maximum share of loan advanced (61 per cent), followed by banks (17 per cent) and private money lenders (3 per cent) (Table 7.59). It is important to note here that the cooperatives had taken the highest share breaking the hypothesis that private money lenders had the highest share in the non-institutional source of lending to fishers.

Table 7.59: Sources of lending (Number of respondents who had availed)

Sl. No.	Sources	Districts				
		Alappuzha	Ernakulam	Kollam	Thrissur	Total
1.	Banks	9 (36.00)	1 (2.85)	7 (35.00)	-	17 (17.00)
2.	Co-operative	10 (40.00)	26 (74.28)	6 (30.00)	19 (95.00)	61 (61.00)
3.	Private money lenders	3 (12.00)	-	-	-	3 (3.00)

Figures in parenthesis indicate percentage to total

(vi) Purpose of availing loans

The respondents availed loans for both fishing and personal purposes. The maximum share of 34 per cent of the respondents availed loans for house construction / Land purchase, followed by respondents, who availed loan for purchase of craft and gears and other fishery related equipments (29 per cent) (Table 7.60). This was followed by the loans availed for

performing the marriage of their wards (15 per cent) and for education of their children (3 per cent). Among the four districts the percentage of respondents who availed loans for house construction was high in Alapuzha district (56 per cent) and for fishing purpose it was high in Thrissur district (30 per cent).

Table 7.60: Purpose of availing loans (Number of respondents who had availed*)

Sl. No.	Purpose	Districts				
		Alappuzha	Ernakulam	Kollam	Thrissur	Total
1.	Purchase of craft/ gear and other fishing related equipments	5 (20.00)	13 (37.14)	5 (25.00)	6 (30.00)	29 (29.00)
2.	House construction / Land purchase	14 (56.00)	9 (25.71)	4 (20.00)	7 (35.00)	34 (34.00)
3.	Marriage expense	1 (4.00)	5 (14.25)	3 (15.00)	6 (30.00)	15 (15.00)
4.	Education	2 (8.00)			1 (5.00)	3 (3.00)
5.	Health and Social Security					
6.	Any others				1 (5.00)	1 (1.00

Figures in parenthesis indicate percentage to total
**There can be multiple purposes too*

(vii) Suggestions for enhancing income and employment generation by fishermen

Respondent fishermen of Kerala were having the opinion that arranging institutional credit through micro finance and SHGs will be an important option to enhance the income and employment among the fisherfolk.

IV. Brackish water Aquaculture - Tamil Nadu

The results and discussions are presented under the following heads

A. General particulars
B. Literacy status
C. Health status
D. Income status

The general particulars of respondent's households included age, family size, family composition etc.

A. General particulars

(i) Age distribution

The age distribution of respondent households are given in Table 7.61

Table 7.61: Age distribution of the sample respondents (years)

Sl.No.	Districts	<35	36-55	>56	Total
1.	Karaikkal	7 (23.33)	22 (73.33)	1 (3.33)	30 (100.00)
2.	Nagapattinam	18 (24.00)	46 (31.33)	11 (14.66)	75 (100.00)
3.	Total	25 (23.80)	68 (64.76)	12 (11.42)	105 (100.00)

Figures in parenthesis indicate percentage to total

Fishing continues to be an activity mostly done by fisherfolk in the age group of 36-55 which constitutes about 65 per cent of the respondents. The distribution also indicated the representation of young (age less than 35) constituting to 23 per cent. The fisherfolk with age more than 56 was found to be 12 per cent and was represented least. The shrinkage of old age fisherfolk representation indicates the growing complexities of the fishing operation.

The age wise distribution did not show any significant difference across the urban and rural districts selected. However the rural district of Nagapattinam indicated young fisherfolk representing 47.05 per cent of the sample respondents which properly indicates the same as a remunerative livelihood option. It may be also seen that the percentage of younger people involved in active fishing was found to be comparatively less in Karaikkal, on account of available alternative avocations.

(ii) Family composition

The family composition of the respondents is indicated in Table 7.62. It is seen from the table that the males outnumber the females (54 per cent). The male-female ratio was found to be 1.22:1.00 for the total households.

Table 7.62: Family composition of the respondent households –Male and Female (Number)

Sl.No.	Districts	Households	Male	Female	Total
1.	Karaikkal	30 (24.00)	69 (55.20)	56 (44.80)	125 (100.00)
2.	Nagapattinam	75 (26.50)	156 (55.12)	127 (44.87)	283 (100.00)
3.	Total	105 (25.11)	225 (53.82)	183 (43.77)	418 (100.00)

Figures in parenthesis indicate percentage to total

(iii) Family size

Family sizes of the respondent households are given in Table 7.63. The small family norm is mostly adopted by the fisher households of Tamil Nadu. The average size of family in Tamil Nadu worked out to be 3.96 ranging from 3.77 in Nagapattinam to 4.16 in Karaikkal district. It is interesting to note that 76 percentages of fisher households in Tamil Nadu is housing 2-4 members and hardly 1 per cent of households are having more than 7 members in the family. There exists no difference in the family size across the both districts which indicate the popularization of the small family norms across the state.

Table 7.63: Family size of the respondent households (number)

Sl. No.	Districts	Family Size				Total	Average family size
		1	2-4	5-6	7-10		
1.	Karaikkal		21 (70.00)	8 (26.66)	1 (3.33)	30 (100.00)	4.16
2.	Nagapattinam	1 (1.33)	59 (78.66)	15 (20.00)		75 (100.00)	3.77
3.	Total	1 (0.95)	80 (76.19)	23 (21.90)	1 (0.95)	105 (100.00)	3.96

Figures in parenthesis indicate percentage to total

(iv) Age composition

The classification of fisher population as adults (above 15 years) and children (less than 15 years) are given in Table 7.64.

The male – female ratio of the adult group (>15 years) was found to be 1.27:1.00 whereas the same for the children (<15 years) was found to be 1.05:1.00. In all other categories males outnumber the females perhaps justifying the common notion preference of males to females in the coastal areas. It is also significant to note that that the younger generation of children is almost represented mostly by males over female. The child to adult ratio was found to be 1: 4.1 for the total sample whereas for the karaikkal district it was found to be 1:1.90 and that for Nagapattinam districts it was found to be 1:6.65.The results clearly indicate that the number of children in Nagapattinam outnumber the Karaikkal district children and changing paradigms of family size in different districts.

Table 7.64: Age composition of the respondent households (Number)

Sl. No.	Districts	Adult (> 15 years)		Children < 15 years)		Total	
		Male	Female	Male	Female	Male	Female
1.	Karaikkal	47 (68.11)	35 (62.50)	22 (31.88)	21 (37.50)	69 (100.00)	56 (100.00)
2.	Nagapattinam	137 (87.82)	109 (85.82)	19 (12.18)	18 (14.17)	156 (100.00)	127 (100.00)
3.	Total	184 (81.77)	144 (78.68)	41 (18.22)	39 (21.32)	225 (100.00)	183 (100.00)

Figures in parenthesis indicate percentage to total

B. Literacy status

The literacy status of the respondent households was analyzed through the literacy level, educational status – continuing and dropouts and access to educational facilities. The illiterate indicates fisherfolk without any formal education and doesn't even possess functional literacy.

(i) Literacy status

The literacy status includes the level of education as indicated by primary, secondary and collegiate. The primary level indicated schooling till fourth grade, secondary level indicated by high school, secondary and vocational education. The collegiate level of education was denoted by collegiate and professional education.

The general literacy rate of Tamil Nadu as a whole was 73.52 per cent (Census-2001) against the literacy rate of 64.64 per cent among the fisherfolk. The results indicate that among the literates 26 per cent have primary level of education, 61 per cent have secondary level of education and hardly 13 per cent have collegiate level of education. The person with primary education was more in Karaikkal than in Nagpattinam districts. The overall literacy rate for the total samples was found to be 69.13 per cent much lesser than the average state literacy rate.

The literacy rate for the both districts (Karaikkal and Nagpattinam) was found to be 96 per cent and 95 per cent. The results indicate that the literacy does not seem to be skewed toward the districts among fisher population. Also the literacy indicates higher level when compared to the state and sector average.

Table 7.65: Literacy status of respondent household (Number)

Sl. No.	Districts	Total	Illiterate	Literate	Primary Level	Secondary Level	Collegiate Level
1.	Karaikkal	125	-	120	40 (33.33)	76 (63.33)	4 (3.33)
2.	Nagapattinam	283	12	269	36 (13.38)	199 (73.97)	34 (12.63)
3.	Total	418	12	289	76 (26.29)	175 (60.55)	38 (13.14)

Figures in parenthesis indicate percentage to total

(ii) Educational profile

The information on education of the respondents in terms of continuing and discontinuance of education would provide the scope of employment, opportunities, possible migration, and alternative avocation of the sample households. Thus continuing and dropout ratios were calculated among the respondent households across the both districts.

The dropouts were more at secondary level of education with 82 per cent ranging from to 76 per cent in Karikkal to 84 per cent at Nagapattinam (Table 7.66) The dropout at primary level of education was about 12 per cent ranging from 23 per cent at Karikkal to 8 per cent at Nagapattinam. The dropout at collegiate level is 7 per cent at Nagapattinam districts. The people indicated as continuing are students which form about 25 per cent of the total family members. The Continuing to Dropout ratio which indicates a parameter on increasing education was found to be 53.84 per cent for Karaikkal districts and 28 per cent for Nagapattinam districts. Alternative source of livelihood, possibility of seeking employment in fisheries enterprises, scope of labour can be the reasons for the increasing dropouts among the urban districts

Table 7.66: Educational status of respondent households - Continuing and Dropout (Number)

Sl. No.	Districts	Continuing	Drop outs			
			Primary	Secondary	Collegiate	Total
1.	Karaikkal	42	18 (23.07)	60 (76.92)	-	78 (100.00)
2.	Nagapattinam	61	18 (8.25)	185 (84.86)	15 (6.88)	218 (100.00)
3.	Total	103	36 (12.16)	245 (82.77)	15 (5.06)	296 (100.00)

Figures in parenthesis indicate percentage to total

(iii) Access to educational institutions

Access to education is an important yardstick to measure the socio-economic well being of a society. The proximity of the educational institutions like primary school, high school, college and professional college provides a major impetus when it comes to continuing education. That was something the fisherfolk were said to be denied earlier which was disproved by this analysis.

The access to education was analyzed by finding the distance to nearby educational institutions. The average distance from fishing villages to nearly primary, high school, college and professional institution are given in Table 7.67. As a whole the average distance to a primary school is 1.27 km, high school 2.60 km, college is 5.97 km and professional institution 14.13 km from fishing villages in Tamil Nadu. The average distance to primary school ranges

from 0.81 km in Karaikkal to 1.74 km for Nagapattinam. The distance for high schools ranges from 1.95 km for Karaikkal district to 3.25 km for Nagapattinam. With regards to colleges average distance ranges from 4.30 km for Karaikkal district to 7.64 km for Nagapattinam. The average distance for professional institution ranges from 3 to 24 kms among different districts .The results very clearly indicate the reasons for growing literacy among the fisherfolk. Thus the analyses clearly indicate that the improved or increased access to educational facilities has helped to increase the literacy level of the fisherfolk.

Table 7.67: Access to education (Distance in km)

Sl. No.	Districts	Distance to nearby educational institution (in km)			
		Primary School	High School	College	Professional College
1.	Karaikkal	0.81	1.95	4.30	3.83
2.	Nagapattinam	1.74	3.25	7.64	24.42
3.	Total	1.27	2.60	5.97	14.13

(C) Health status

The average life expectancy of people in the state is worked out at 65.5 years ranging from 62.8 years for male to 68.2 years for female.

The health status of the respondent households was studied based on the parameters like administration of vaccines, incidence of discontinuation, birth weight of infants, incidence of maternal and child mortality at the time of birth, incidence of common diseases and special ailments among adults and children. Disease management aspects like access to health care, problems in health management and suggestions to improve the health care facilities are also dealt in this session.

(i) Vaccination regime of infants / children (less than 15 years)

The average age of administration of vaccination and incidence of discontinuation among infants/ children with age less than 15 years in the selected coastal districts of Tamil Nadu is furnished in Table 7.68. The vaccination for Pox, BCG, MMR and Polio were regularly taken by all the families covered under the study. The average age at which the vaccination for pox was given to the child worked out at 1.05 years ranging from 1.00 years at Nagapattinam to 1.10 years at Karikkal. The BCG was administered at 10.65 years ranging from 0.43years

Table 7.68:Vaccination regime of infants / children (less than 15 years) – Average Age of administration and incidence of discontinuation

Sl. No.	Districts	Average age of administration andincidence of discontinuation (percentage)							
		Pox		BCG		MMR		Polio	
		Age	IOD* (%)	Age	IOD (%)	Age	IOD (%)	Age	IOD (%)
1.	Karaikkal	1.10	0	0.88	0	1.00	0	2.59	0
2.	Nagapattinam	1.00	0	0.43	0	-	0	4.36	0
3.	Average	1.05	0	0.65	0	0.50	0	3.32	0

Normally polio administration continues till the age of 5 years
**Figures in percentage indicate incidence of discontinuation (IOD)*

at Nagapattinam to 0.88 years at Karikkal. The average age for administering MMR was 0.50 years which varies from 0 years at Nagapattinam to 1.00years at Karikkal. Polio vaccine was administered at the age of 3.32 years varying from 2.59 at Karikkal to 4.36 at Nagapattinam. The vaccination regime of infants/children wide taken that the results on regime in continued as per the recommendation of ICMR.

The traditional beliefs and lack of awareness about the availability of vaccines, lack of time to access the vaccination, lack of sufficient doses of vaccine at the locality and poor reliability on vaccines provided by government agencies were listed as the reasons for discontinuation of vaccination in the questionnaire. However in Tamil Nadu no cases of discontinuation of vaccination among the infants of fisherfolk were reported in the study area.

(ii) Birth weight of infants

The birth weight of infants in fisher households at selected districts is given in Table 7.69. The average birth weight of males was 2.91 kg and female was 2.75 kg. The average weight of male infants ranges from 3014 kg at Karaikkal to 2.69 kg at Nagapattinam and female infants ranges from 2.91 kg at Karaikkal to 2.60 kg at Nagapattinam. This is in conformity with the average birth weight of a male and female child in Tamil Nadu (Census-2001).

Table 7.69: Birth weight of infants (kg)

Sl. No.	Districts	Weight (kg)		
		Male	Female	Total
1.	Karaikkal	3.14	2.91	3.02
2.	Nagapattinam	2.69	2.60	2.64
3.	Average	2.91	2.75	2.83

(iii) Incidence of mortality among mother/ child during birth

Maternal and child mortality at the time of birth and infant mortality had been pressing concerns over the past. The incidence of mortality was and it was found that these exists no incidence of maternal mortality across all selected respondent fisherfolk. One case of infant mortality was reported. Generally in Tamil Nadu, adequate care is being taken now to reduce the incidence of maternal and infant mortality which was recognized by a Central report.

(iv) Incidence of diseases among adults

The incidence, frequency, and previous occurrence of diseases among the adult family members of the respondents across the four coastal districts are discussed in the Table 7.70.

Major diseases found among the respondents were categorized under two groups, viz; common diseases and special ailments. Fever/flu, body ache, diarrhoea, gastro enteric disease, skin disorder, reproductive disorders are included in common diseases. Special ailments include diseases like cardiac failure, tuberculosis, anemia, diabetics, blood pressure, AIDS and others.

The important common diseases found among respondents across the two districts of Tamil Nadu were fever, body ache, diarrhoea and skin disorder in which more number of family members (160) irrespective of their gender differences affected by fever/flu.

Table 7.70. Incidence of diseases among Adult (Male and Female) - Annual frequency

Sl. No.	Diseases	Districts					
		Karaikkal		Nagapattinam		Total	
		M	F	M	F	M	F
	Common Diseases						
1.	Fever/Flu	1.05 (30)	1.34 (29)	1.28 (21)	Nil	1.16 (51)	0.67 (29)
2.	Body Aches	1.00 (8)	1.08 (12)	Nil	Nil	0.50 (8)	0.54 (12)
3.	Diarrhoea	1.10 (30)	1.31 (29)	Nil	Nil	0.55 (30)	0.6 (29)
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil
5.	Skin disorder	1.00 (1)	Nil	2.70 (34)	Nil	0.50 (1)	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil
	Special Ailments						
7.	Cardiac failure	Nil	Nil	1.00 (1)	Nil	0.50 (1)	Nil
8.	TB	Nil	Nil	1.00 (3)	Nil	0.50 (3)	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	1.00 (1)	1.00 (1)	1.00 (1)	Nil	0.50 (1)	Nil

Figures in parenthesis indicate the number of incidence in families,
(others include Thyroid, Sinus)*

However body ache was found to be more among females with an average frequency of 0.54 times per year and 8 male and 12 female family members of the respondents were affected by body ache last year.

Diarrhoea was found commonly among male members than females and 30 male and 29 female family members were affected by diarrhoea last year. Skin disorder also was found more among male family members of the total respondents than females

The district wise distribution of common diseases indicated that occurrence of common diseases like fever, body ache, diarrhoea, skin disorder, and reproductive disorder etc were found high in Karaikkal district in terms of both frequency and number of incidence.

Reported cases of special ailments found among the families of respondents across the two districts encompass cardiac failure, TB, etc. However TB was found more among male family members of the total respondents across the districts. There was not even a single member with special ailments or life style diseases like Anemia, diabetics, blood pressure, and AIDS were seen among the respondent families in Tamil Nadu.

It is quite interesting to note that the respondent households were not affected with life style diseases. The occurrence of diarrhoea and skin diseases can be added to lack of hygienic and coastal population.

(v) Incidence of diseases among adult (male and female) previous occurrence

The previous occurrence of diseases among adults (male and female) based on the number of months is discussed in Table 7.71.

In continuation with the above table, the major diseases found within the study area of Tamil Nadu district under the title of common diseases were fever/flu, body ache, diarrhoea, gastro enteric disease, skin disorder, reproductive disorder etc The most common diseases found among the respondent families were fever and body ache. On an average most recent occurrence of fever/flu was found among male members of the respondent families was 1.95 months and it was 0.91 months among female members .In the case of body ache the previous occurrence was found in 2.31 months in males and 1.25 months ago in females. Occurrence of diarrhoea and skin disorder was seen among male members only in the last quarter of the year. However its occurrence among female members was found 0.87 months and 0.80 months back respectively.

The most common special ailments found among the respondents were cardiac failure, TB and anemia etc. Previous occurrence of cardiac failure and TB among the male members was found in the last quarter of the year, whereas in the case of females it was found in last month. Incidents of anemia found in last month in the case of both male and female respondents.

Table 7.71: Incidence of diseases among adult (Male and Female)
Previous occurrence (Number of months)

Sl. No.	Diseases	Districts					
		Karaikkal		Nagapattinam		Total	
		M	F	M	F	M	F
	Common Diseases						
1.	Fever/Flu	1.86	1.82	2.04	Nil	1.95	0.91
2.	Body Aches	2.62	2.50	2.00	Nil	2.31	1.25
3.	Diarrhoea	1.60	1.75	Nil	Nil	0.80	0.87
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil
5.	Skin disorder	4.00	Nil	1.91	Nil	1.95	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil
	Special Ailments						
7.	Cardiac failure	Nil	Nil	12.00	Nil	6.00	Nil
8.	TB	Nil	Nil	8.00	Nil	4.00	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	2.00	2.00	2.00	Nil	2.00	1.00

(Others include Thyroid, Sinus)*

(vi) Incidence of diseases among children (Male and Female) - Annual frequency

The annual frequency on the incidence of diseases among children (Male and Female) is furnished in Table 7.72.

Major diseases found among the children in the study area were fever/flu, body ache, diarrhoea, gastroenteric disease, skin disorder etc in which fever was the most popular disease found among the children and it was distributed across all the sample districts on Tamil Nadu. The average frequency of fever among male children was 2.88 times per year and a total of 15 male children were affected by fever across the two districts last year. In the case of female children a total number of 17 were affected by fever with an average annual frequency of 1.15 times per year.

Incidence of diarrhoea was also high among the children with a total frequency of 1.07 times per year among the male children and 0.50 times per year among female children. It was found that occurrence of common diseases like fever, body ache, and diarrhoea were high in Karaikkal both in the case of adults and children.

Occurrence of special ailments among the children was found to be very low compared with that of common diseases. Only anemia were reported among the children of respondent families across the sample districts Tamil Nadu. In the case of anemia only one female were affected with a frequency of 0.50 times in a year across the two districts of Tamil Nadu.

Table 7.72: Incidence of diseases among children (Male and Female) - Annual frequency

Sl. No.	Diseases	Districts					
		Karaikkal		Nagapattinam		Total	
		M	F	M	F	M	F
	Common Diseases						
1.	Fever/Flu	2.41 (12)	1.31 (16)	3.30 (3)	1.00 (1)	2.88 (15)	1.15 (17)
2.	Body Aches	1.00 (2)	Nil	Nil	Nil	0.50 (2)	Nil
3.	Diarrhoea	2.15 (13)	1.00 (17)	Nil	Nil	1.07 (13)	0.50 (17)
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil
5.	Skin disorder	1.00 (1)	Nil	Nil	Nil	0.50 (1)	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil
	Special Ailments						
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	1.00 (1)	Nil	Nil	Nil	0.50 (1)
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	Nil	Nil	Nil	Nil	Nil

Figures in parenthesis indicate the number of incidence in families,
(others include Thyroid, Sinus)*

(vii) Incidence of diseases among children -Previous occurrence

The previous occurrence of diseases among children based on the number of months is discussed in Table 7.73.

In continuation with the above table, the major diseases found among the children of the respondent families within the study area include common diseases like fever/flu, body ache, diarrhoea, gastroenteric disease, skin disorder etc. The most common diseases found among children of the respondent families were fever and diarrhoea. On an average last occurrence of fever/flu found among the male children of the respondent families was 1.45 months ago and it was 1.62 months back in the case of female children. In the case of diarrhoea the previous occurrence was found in 1.46 months ago in male children and 0.85 months ago in female children. Occurrence of body ache among the children of respondent families was found in 1.25 month back in the case of males. Skin disorder was also found among the males respondent families with the occurrence of 1.50 month back.

The most common special ailments found among children of respondent families is anemia. Incidence of anemia was reported in female children.

Table 7.73: Incidence of diseases among children (Male and Female) - Previous occurrence (No: of months)

Sl. No.	Diseases	Districts					
		Karaikkal		Nagapattinam		Total	
		M	F	M	F	M	F
	Common Diseases						
1.	Fever/Flu	2.16	2.75	0.75	0.50	1.45	1.62
2.	Body Aches	2.50	Nil	Nil	Nil	1.25	Nil
3.	Diarrhoea	2.92	1.70	Nil	Nil	1.46	0.85
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil
5.	Skin disorder	3.00	Nil	Nil	Nil	1.50	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil
	Special Ailments						
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	2.00	Nil	Nil	Nil	1.00
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	Nil	Nil	Nil	Nil	Nil

(Others include Thyroid, Sinus)*

(viii) Access to health care

The access to health care is also an important parameter which determines the continued health of the fisherfolk. Often the distance leads to the non treatment or its delay. The access to health care was measured using the distance required to avail the same. (Table

7.74). The results indicate that there exists considerable access to the primary health centre and hospital. On an average the primary health centre was available at a distance of 2.10 km and the hospital at 12.70 km. Karaikkal districts indicated the proximity of the primary health centre and hospital at a distance of 1.40 and 4.20 km respectively.

Table 7.74: Access to health care (km)

Sl. No.	Districts	Primary Health Centre	Hospital
1.	Karaikkal	1.40	4.20
2.	Nagapattinam	2.81	21.20
3.	Total	2.10	12.70

(Others include Thyroid, Sinus)*

(ix) Problems in health management

The major problems underwent in health management was analyzed based on the opinion of the sample respondents. The major reasons cited by the respondents are indicated in Table 7.75. The major reasons suggested include difficulty in accessing the hospital due to distance, non availability of specialist and para medicines in health centers, poor infrastructure, lack of adequate effective medicines, problems on cleanliness/ sanitation, drinking water problem and work related stress.

Work related stress was the major problem as perceived by the respondent's households (38.09 per cent). 23.80 per cent of the respondents opined on the poor infrastructure, 16.19 per cent for drinking water problem and 19.04 has the difficulty in accessing the hospital due to distance.

Table 7.75 : Problems in health management (Frequency)

Sl. No.	Problems	Districts		
		Karaikkal	Nagapattinam	Total
1.	Difficulty in accessing the hospital due to distance	-	20 (26.66)	20 (19.04)
2.	Non availability of specialist and paramedicines in health centers	8 (26.66)	-	8 (7.61)
3.	Poor infrastructure	15 (50.00)	10 (13.33)	25 (23.80)
4.	Lack of adequate effective medicines	6 (20.00)	-	6 (5.71)
5.	Problems on Cleanliness/ Sanitation	8 (26.66)	8 (10.66)	16 (15.23)
6.	Drinking water problem	5 (16.66)	12 (16.00)	17 (16.19)
7.	Work related stress	-	40 (53.33)	40 (38.09)
8.	Others	-	-	-

Figures in parenthesis indicate percentage to total respondents
Number of respondents who had opined on the same

(x) Suggestions to improve healthcare facilities

The respondent households opined on the different suggestions for improving the health care facilities and the details are furnished in Table 7.76. The major suggestions from

the respondents of Kariaikkal and Nagapattinam includes; increasing the number of doctors/ specialists, construction of quarters facility for doctors so that they are available 24 x 7, providing available sufficient medicines for all diseases with free of cost, construction of the modern hospital with all infrastructure and healthcare facilities, provision of ambulance for emergency (especially during delivery accidents, etc.) and providing good drinking water facility.

Table 7.76: Suggestions to improve health care facilities (Frequency)

Sl. No.	Suggestions	Districts		
		Karaikkal	Nagapattinam	Total
1.	Increase the number of doctors/specialists	12 (40.00)	13 (17.33)	25 (23.80)
2.	Make quarters facility for doctors so that they are available 24 x 7	8 (26.66)	7 (9.33)	15 (14.28)
3.	Make available sufficient medicines for all diseases with free of cost	19 (63.33)	2 (2.66)	21 (20.00)
4.	Construct the modern hospital with all infrastructure and health care facilities.	2 (2.66)	2 (2.66)	4 (3.80)
5.	Provide ambulance for emergency (especially during delivery accidents, etc.)	-	-	-
6.	Need good drinking water facility	9 (30.00)	22 (29.33)	31 (29.52)

Figures in parenthesis indicate percentage to total respondents
Number of respondents who had opined on the same

D. Income status

The income profiling of the respondent households are analyzed using income patterns, respondents involvement in non fisheries activities and expenditure pattern. In addition the indebtedness and savings were analyzed using details on savings, indebtedness , sources of lending organization, purpose of availing loan and suggestions for enhancing the income and employment generation

(i) Income pattern

The income pattern of the respondent household were analyzed using the weekly income across the two coastal districts of Tamil Nadu including Nagapattinam and karaikkal are discussed in the Table 7.77.

Table 7.77: Income status of the respondents (Monthly Rs)

Sl. No.	Districts	Enterprise					
		Fishery	Labour	Agriculture	Business	Any others	Total
1.	Karaikkal	5675.20 (94.19)	183.32 (3.04)	66.64 (1.10)	-	100.00 (1.65)	6025.00 (100.00)
2.	Nagapattinam	5796.84 (38.27)	4172.16 (27.54)	1153.96 (7.61)	1654.00 (10.92)	2368.92 (15.64)	15145.90 (100.00)
3.	Total	8327.68 (60.15)	2177.72 (15.73)	610.32 (4.40)	827.00 (5.97)	1901.16 (13.73)	13844.00 (100.00)

Figures in parenthesis indicate percentage to total

The major income sources of the respondent households comprised of income from fishery, business, agriculture, labour services, and other service sectors. The highest weekly average income generated by the total respondents across the two districts was through fisheries sector with an average amount of ₹ 8327.68 (60.15 per cent of the total income) followed by income from labour sector at ₹2177.72(15.73%), and other service sector at ₹1901.16 (13.73%)

The district wise weekly income status of the respondents indicated that Nagapatinam district had all sources of income which includes fisheries sector (38.27%), Labour (27.54%), Agriculture (7.61%) etc which was contributing an average weekly income of ₹15145.90. In Karaikkal district the average income shared by fisheries sector, labour and other service sectors was 94.19 and 3.04 and 1.65 per cent respectively.

(ii) Involvement in non fisheries activities

The Involvement of respondent' households in non fisheries activities are illustrated in the Table 7.78.

The analysis on the respondent' households involvement in the non fisheries activities indicated that 44 per cent of the total respondents were involved in non-fisheries activities, which provided an additional source of income. The major non fishing activities involved by respondents were business, labour, and other service sectors with a contribution of 17.33, 50 and 36 per cent respectively. The total number of respondents involved in business was 35 per cent in Nagapattinam district. In Nagapattinam 87 per cent of the respondents involved in labour activities which might be due to the higher wage rate prevailing in the state. It was found that there was not even a single respondent involved in business activities in the Karaikkal district. The result clearly indicated the existence and practice of alternative avocation do exist holds good in the selected respondent households.

Table 7.78: Respondents involvement in non-fisheries activities

Sl. No.	Districts	Labour	Agriculture	Business	Any others	Total
1.	Karaikkal	4 (13.33)	1 (3.33)	-	1 (3.33)	6 (0.53)
2.	Nagapattinam	65 (86.66)	38 (50.66)	26 (34.66)	52 (69.33)	181(96.79)
3.	Total	69 (49.99)	39 (26.99)	26 (17.33)	53 (36.33)	187(100.00)

Figures in parenthesis indicate percentage to total

(iii) Pattern of expenditure

The major household expenses measured include expenditure on food, clothing, fuel, medical, education, entertainment, personals and durables. The result of the pattern of weekly expenditure is represented in Table 7.79.

The average weekly expenditure pattern of the 140 households worked out that on an average ₹4530.92 was incurred on the households with ₹1936.88 (42.74 per cent) on food and ₹384.76 (8.49 per cent) on medical. The least expenditure was ₹259.04 (5.71 per cent) for entertaintments..

Table 7.79: Expenditure pattern of the fisher family (Monthly Rs.)

Sl. No.	Districts	Items								
		Food	Cloth-ing	Fuel	Medi-cal	Edu-cation	Enter-tainment	Per-sonal	Dura-bles	Total
1.	Karaikkal	2266.64 (71.50)	161.20 (5.08)	221.72 (6.99)	111.20 (3.50)	107.60 (3.39)	-	133.32 (4.20)	168.24 (5.30)	3170.00 (100.00)
2.	Nagapattinam	1607.12 (27.27)	769.32 (130.5)	534.72 (9.07)	658.36 (11.17)	609.64 (10.34)	518.12 (8.79)	578.40 (9.81)	616.08 (10.45)	5891.88 (100.00)
3.	Total	1936.88 (42.74)	465.24 (10.26)	378.20 (8.34)	384.76 (8.49)	358.60 (7.91)	259.04 (5.71)	355.88 (7.85)	392.16 (8.65)	4530.92 (100.00)

Figures in parenthesis indicate percentage to total

The total expenditure pattern of the selected districts indicates that the highest household expenditure was noticed in Nagapattinam with an average amount of ₹ '5891.88 and the least in Karaikkal districts ₹ 3.170.00. In Nagapattinam fisherfolks spent more on education purpose with an average amount of ₹ 609.64(10.34 per cent) than karaikkal district.

The fisherfolk of Karaikkal district spent 71.50 % for food,5.08% for clothing and 5.30 percentage respectively on personal expenditure .In Nagapattinam the least expenditure was incurred on fuel and entertaintment at 9.07 and 8.79 per cent respectively. The medical expense was also high in Nagapattinam which is ₹658.36 (11.17 per cent) when compared with other selected coastal districts.

The results table clearly spelt out that the expenditure incurred on food contribute the most of the family expenditure. Education, Entertainment and Social Security measures hold increasing proposition in the family expenditure across the selected coastal districts.

(iv) Indebtedness and Savings

The indebtedness and savings of the respondent households are indicted in Table 7.80.

Table 7.80: Savings details of respondent households

Sl. No.	Districts	Frequency of respondents having Savings				Total
		Nil	< 50 k	50-100.00k	>100.00K	
1.	Karaikkal	30 (100.00)	-	-	-	30 (100.00)
2.	Nagapattinam	1 (1.33)	63 (84.00)	9 (12.00)	2 (2.66)	75 (100.00)
3.	Total	31 (29.52)	63 (60.00)	9 (8.57)	2 (1.90)	105 (100.00)

Figures in parenthesis indicate percentage to total

The saving details of the respondent's household indicated that 29.52 per cent of the respondents have no savings. 60 per cent of the respondent households possessed a saving of less than ₹50000. It is significant to note that 95 per cent of the households which had savings were from Nagapattinam district. Lack of savings or dis savings related to the need for indebtedness for the sustenance of the livelihoods. The average savings of a Nagapattinam household was found to be ₹935000. The plight of respondent households from Karaikkal is well understood where none of them possess savings.

(v) Indebtedness

The lack of savings and the need for the sustenance of the livelihood often lead to indebtedness. The pattern of indebtedness of respondent households across the two coastal districts of Tamil Nadu is discussed in Table 7.81.

The results indicated that the average amount of indebtedness per person was ₹71,066.66 in which the highest average amount of indebtedness was recorded in Nagapattinam district with ₹129800.

On an average 14.81 per cent of the availed loans was repaid .The analysis of repayment of the availed indebtedness indicated that the respondents households in Karaikkal repaid 16.18 per cent of the loans availed whereas the least repayment was found in Nagapattinam 14.68 per cent respectively.

Table 7.81: Indebtedness of the respondents households

Sl. No.	Districts	Number of persons	Average Amount per person	Average Amount repaid
1.	Karaikkal	7 (23.33)	12333.33	1996.66 (16.18)
2.	Nagapattinam	60 (80.00)	129800.00	19063.20 (14.68)
3.	Total	67 (63.08)	71066.66	10529.93 (14.81)

Figures in parenthesis indicate percentage to total

(vi) Sources of lending

The indebtedness often results in availing loans from the different institutions. The major sources of lending organizations include banks, co-operatives, private money lenders, friends/relatives and jewel loans. The details of the sources of money lending as availed by the respondent households is furnished in Table 7.82.

A total of 86 respondents had availed loans for various purposes. It was found that private money lenders constituted the major source of lending organizations with more than 24.76 of the respondent household availing credit. Banks provided credit to 35 respondents and constituted more than 20 per cent of the sample respondents.

Table 7.82. Sources of lending

Sl. No.	Sources	Districts		
		Karaikkal	Nagapattinam	Total
1.	Banks	-	21 (28.00)	21 (20.00)
2.	Co-operative	1 (3.33)	13 (17.33)	14 (13.33)
3.	Private money lenders	5 (16.66)	21 (28.00)	26 (24.76)
4.	Friends / Relatives	-	-	-
5.	Jewel loans	1 (3.33)	5 (6.66)	6 (5.71)
6.	Others	7 (23.33)	-	7 (6.66)

Figures in parenthesis indicate percentage to total

Cooperatives provided 13.33 per cent loan to the respondents where as jewel loans lesser significance as a lending organization has with hardly 5 per cent of the respondents availing loan. It was important to note that in Karaikkal and Nagapattinam the respondent's household exhibited dependency towards private money lender.

The analysis indicate that the non institutional credit still holds good among the fishers in Tamil Nadu .It was found that the highest number of respondents (24.76 per cent) was depending on private money lenders for borrowing money in emergency situation.

(vii) Purpose of availing loans

The details on the purpose of availing loans and number of loans availed by the respondent households are indicated in Table 7.83.

The major purposes for which loans were availed include purchase of craft/gear and other fishing related equipments, house construction/land purchase, marriage expenses., education and health and social security etc.

The purpose of house construction and land purchase was the major reason for availing loans. It was found that of the 85 respondents who availed loans, more than 23.8 per cent was availed for the purpose of purchase of craft/gears and other fishing related equipments, 22.85 per cent for the marriage expense,6.66 per cent for house construction and land purchase found importance among the respondent households.

In Nagapattinam district of Tamil Nadu the major chunk of loans were attributed towards purchase of craft/gear and other fishing related equipments (32%) followed by house construction and land purchase (30.66%). In Karaikkal district 10 per cent of the respondent's availed loans for house construction and land purchase followed by 3.33 per cent towards purchase of craft/gear and other fishing related equipments.

(xxv) Suggestions to enhance the income and employment generation

The percentage response of the respondents' suggestions for enhancing the income and employment generation by fishermen is indicated in Table 7.83.

Table 7.83 Purpose of availing loans (Number of respondents who had availed)

Sl. No.	Purpose	Districts		
		Karaikkal	Nagapattinam	Total
1.	Purchase of craft/ gear and other fishing related equipments	1 (3.33)	24 (32.00)	25 (23.80)
2.	House construction / Land purchase	3 (10.00)	4 (5.33)	7 (6.66)
3.	Marriage expense	1 (3.33)	23 (30.66)	24 (22.85)
4.	Education	-	5 (6.66)	5 (4.76)
5.	Health and Social Security	1 (3.33)	4 (5.33)	5 (4.76)
6.	Any others	1 (3.33)	-	1 (0.95)

Figures in parenthesis indicate percentage to total

The major suggestions perceived by the households included arranging the institutional financial support like micro credit for fisher folk; SHG, etc, regulation of fish marketing through institutional interventions; vocational training for fisherwomen to undertake house hold income activities during dry/off season; regulation of PDS and supply of the basic food items and fuel(like kerosene, LPG, etc) by the Govt. agencies and provision of rural infrastructure for general societal/human development.

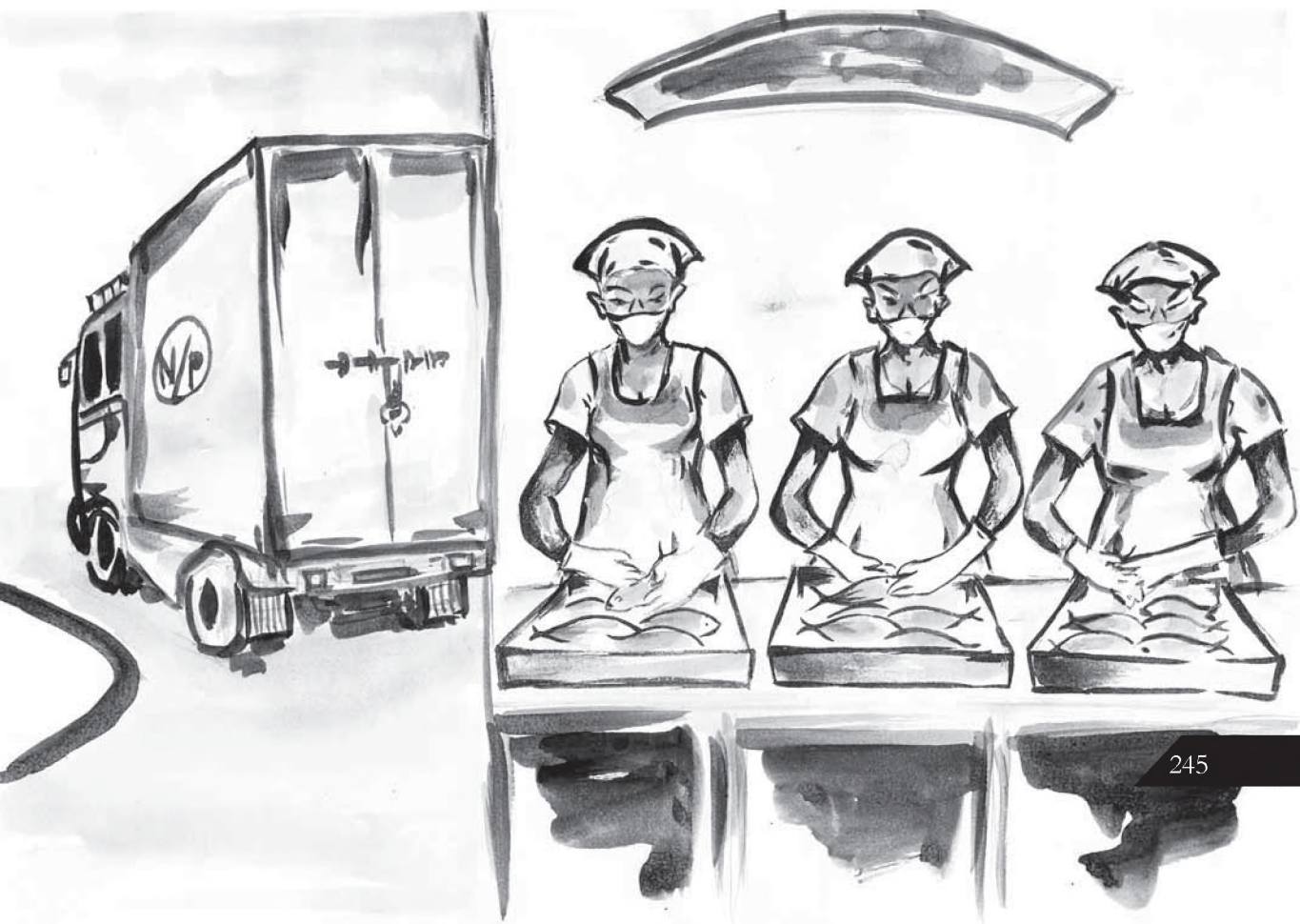
The percentage response of the respondents indicated that 45.71per cent of the respondents felt that arranging the institutional financial support like micro credit for fisheries, SHG, etc can provide a major impetus in enhancing the income. There were no suggestions on Vocational training for fisherwomen to undertake household income activities during dry/ off season, regulation of PDS and supply of the basic food items and fuel (like kerosene, LPG, etc) by the Govt. agencies and provision of rural infrastructure for general societal / human development found a meek response among the respondents in both the districts.

Table 7.85. Suggestions for enhance the income and employment generation by fishermen (Percentage response)

Sl. No.	Suggestions	Districts		
		Karaikkal	Nagapattinam	Total
1.	Arranging the institutional financial support like micro credit for fisheries, SHG, etc	3 (10.00)	45 (60.00)	48 (45.71)
2.	Regulation of fish marketing through institutional interventions	-	-	-
3.	Vocational training for fisherwomen to undertake house hold income activities during dry/ off season	2 (6.66)	1 (1.33)	3 (2.85)
4.	Regulation of PDS and supply of the basic food items and fuel(like kerosene ,LPG,etc) by the Govt. agencies	-	-	-
5.	Provisional of rural infrastructure for general societal / human development	-	-	-

Figures in parenthesis indicate percentage to total

Marketing and Processing 08



08

Marketing And Processing

Nikitha Gopal, Shyam S. Salim, M. Krishnan, R.S. Biradar, Pradeep Katiha, Nagesh Kumar Barik, Rakesh kumar, Arpita Sharma and K.Ponnusamy

Background

India is the third largest fish producing country in the world. The sector has high potentials for rural development, domestic nutritional security, employment generation as well as export earnings. Indian fisheries sector has been witnessing a steady growth, and the annual fish production has risen to 7.85 million tonnes during 2009-10. The rate of growth of the inland sector has been high and the inland fish production is 4.87 million tonnes and has almost doubled in the last decade. It is estimated that fishing, aquaculture and allied activities provide employment to over 14 million people.

Marketing and processing are two important ancillary sectors and are important links in the value chain in the fisheries sector. These sectors provide livelihood support for larger number of households by income generation through fish marketing and processing activities. More than 70 per cent of the fish produced in the country is channelled into the domestic market, while the rest is processed and its contribution is to the tune around Rs. 9,921 crores in foreign exchange. The processing industry in India has been almost entirely export oriented and employs mainly women. Approximately 10 lakh people are engaged in seafood processing industry in India. The industry is spread in the coastal states of the country. There are 369 seafood processing units, of which 265 are EU approved, and more than 900 exporters. Considering the marketing activities, the landing centres serve as primary markets and the wholesale markets situated at a distance away from actual fish landing centres act as secondary markets. The retail markets normally situated near to consuming centres work as tertiary markets. In some cases, wholesale markets may also have a separate retail section. Normally, secondary and tertiary markets are located in interior areas.

Recently an increased attention has been given to education and literacy of fishing community which is supposed to play a major role in achieving livelihoods (Maddox, 2007). The relationship between the income generated and livelihood are often supplemented by the

literacy level and health status of the people engaged in various activities. FAO and ILO have advocated that "literacy and numeracy are essential for workers to increase their productivity and income". Accessibility to educational institutions and programmes will improve the livelihood of fishermen, by diversifying their income generating activities (FAO, 2006). Likewise, strong and continued health is a requirement for achieving sustainable livelihood for fishing communities. It has been reported that the work stress and health hazards of the fish processing works are considerably high due to the productivity demand and the low levels of technology used (Gopal, N, *et al.*, 2009). With this background, the present study tries to throw light on the general demographic, occupational, income generation, educational and health status of fisher households engaged in fish marketing and processing activities across various coastal states of India.

Objectives of the Study

The objective of the present study was to assess the status of literacy, health and income of fisher folk engaged in fish marketing and processing activities along the coastal states of India.

Area of study and sampling frame

The sampling frame for the study to assess the literacy, income and health status of persons involved in allied activities of marketing and processing in the fisheries sector is given in Table 8.1.

Table 8.1 Area of study and sampling frame

Sl. No.	Sub-sector	Details	Sample size
1.	Processing	Kerala, Gujarat, Andhra Pradesh and Maharashtra	248
2.	Marketing	Kerala, Gujarat, Andhra Pradesh, Maharashtra, West Bengal , Madhya Pradesh and Delhi	400
3.	Total		648

The study was done among the households engaged in marketing and processing activities in seven coastal states of India which include Kerala, Gujarat, Andhra Pradesh, Maharashtra, Delhi, Madhya Pradhesh and West Bengal. A sample of 50 processing households each were selected from Kerala, Gujarat, Maharashtra and nearly 98 samples from Andhra Pradesh making the total sample size as 248. Similarly a total sample size of 400 was decided for the

Table 8.2: Detailed sampling frame of the study

Sl. No.	State	Sample size (processing)	Sample size (marketing)
1.	West Bengal		50
2.	Andhra Pradesh	97	100
3.	Kerala	51	50
4.	Maharashtra	50	50
5.	Gujarat	50	50
6.	Delhi		50
7.	Madhya Pradesh		50
8..	Total	248	400

households engaged in marketing activities along the 7 coastal states Kerala, Gujarat, Andhra Pradesh, Maharashtra, Delhi, Madhya Pradhesh and West Bengal (Table 8.2)

Further details about the districts selected for data collection in various states is given in Table 8.3. Random sampling was followed for collection of the information based on a pre-tested questionnaire designed for the study.

Table8. 3: Districts selected for the study

Sector	State	District(s)				
Pro-cessing	Kerala	Calicut	Ernakulam	Kollam	Malappuram	Trivandrum
	Gujarat	Junagadh	Porbandar			
	Andhra Pradesh	Visakhapatnam				
	Maharashtra	Thane	Raigad			
Mar-keting	Kerala	Calicut	Ernakulam	Kollam	Malappuram	Trivandrum
	Gujarat	Junagadh	Porbandar			
	Andhra Pradesh	Visakhapatnam				
	Maharashtra	Thane	Raigad	Ratnagiri		
	West Bengal	Howrah				
	Delhi	Delhi				
	Madhya Pradesh	Bhopal	Raisen	Sehore		

Methodology

Field level data collection was carried out from selected states. The data collection was done using a structured survey schedule after a reconnaissance survey from the selected sample respondents. The data collection was on four parameters viz., the general particulars, literacy, health, and income profiling. The data covered both urban and rural households and also represented the three sectors viz., the mechanized, motorized, and the traditional sectors. The data collection was done by the project team in most cases and in some location trained enumerators were employed. The data collected were tabulated and the results were analyzed.

Conventional tools of analysis and percentage analysis were done to process the data and bring out the literacy, income and health status of the fishers in India and to arrive at meaningful conclusions. The data obtained from the respondents were systematically tabulated for the purpose of analysis.

The results and discussions are presented under the following heads for marketing and processing sectors.

A. General particulars
B. Literacy profile
C. Health profile
D. Income profile

A. General particulars

The general particulars of the respondents like age distribution, family and household information and male-female ratio are presented in this section.

(i) Age distribution

Table 8.4: Age wise details of the sample respondents in post- harvest sector (years)

States	Age categories			
	<35	36-55	>56	Total
Andhra Pradesh	75 (38.07)	106 (53.81)	16 (8.12)	197
Delhi	33 (66.00)	12 (24.00)	5 (10.00)	50
Gujarat	38 (38.00)	57 (57.00)	5 (5.00)	100
Kerala	12 (11.88)	62 (61.39)	27 (26.73)	101
Madhya Pradesh	25 (50.00)	22 (44.00)	3 (6.00)	50
Maharashtra	11 (11.00)	69 (69.00)	20 (20.00)	100
West Bengal	19 (38.00)	27 (54.00)	4 (8.00)	50
Total	213 (32.87)	355 (54.78)	80 (12.35)	648

Figures in parenthesis indicate percentage to total

The age distribution of the respondents is given in Table 8.4. Most respondents fell in the category of 36-55 years (54.78 per cent). This trend was observed in Andhra Pradesh, Gujarat, Kerala, Madhya Pradesh, Maharashtra and West Bengal. In comparison with the other states Delhi & Madhya Pradhesh were having more respondents from the age group below 35 years with 66 per cent and 55 per cent respectively. Only 12.35 per cent of the respondents fell in the age group above 56 years. Marketing and processing is generally carried out by persons in the active working age group, as it requires skill as well as physical exertion in some cases, especially in marketing. Since the younger group was involved in fish marketing in both these states, majority of the respondents in marketing were from the same catagory

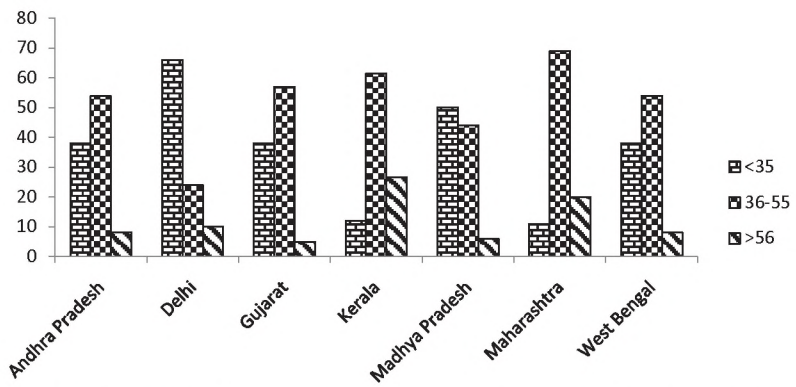


Fig. 8.1: Age distribution of respondents in the post harvest sector

The state wise age distribution of the persons involved in marketing and processing is indicated in figure 8.1. In Andhra Pradesh (53.81 per cent), Gujarat (57.00 per cent), Kerala (61.39 per cent), Maharashtra (69.00 per cent) and West Bengal (54.00 per cent) the maximum number of respondents were in the middle age group of 36-55 years. In Delhi (66.00per cent) and Madhya Pradesh (50.00 per cent) the respondents in age group below 35 years dominated. The younger group was involved in fish marketing in both these places, as only respondents belonging to marketing were selected in these two states. The older age group (above 56 years) was comparatively less among the respondents with 8.12 per cent in Andhra Pradesh, 10.00 per

cent in Delhi, 5.00 per cent in Gujarat, 26.73 per cent in Kerala, 6.00 per cent in Maharashtra and 8.00 per cent in West Bengal. The percentage of respondents in old age category is slightly higher in Kerala and Maharashtra where they have been involved in marketing and processing longer than in other states.

Table 8.5: Household particulars of the sample respondents in post- harvest sector –male and female (Number)

States	Households	Male	Female	Total	Male-Female Ratio
Andhra Pradesh	197	290 (48.90)	303 (51.10)	593	0.96
Delhi	50	103 (53.65)	89 (46.35)	192	1.16
Gujarat	100	198 (49.50)	202 (50.50)	400	0.98
Kerala	101	199 (48.54)	211 (51.46)	410	0.94
Madhya Pradesh	50	122 (57.82)	89 (42.18)	211	1.37
Maharashtra	100	229 (51.93)	212 (48.07)	441	1.08
West Bengal	50	124 (53.45)	108 (46.35)	232	1.15
Total	648	1265 (51.03)	1214 (48.97)	2479	0.96

Figures in parenthesis indicate percentage to total

(ii) Family composition

The family composition of the respondents is indicated in Table 8.5. It can be observed from the table that overall; males outnumber the females with the male-female ratio being 1.04. More than males females were seen in Delhi, Madhya Pradesh, Maharashtra and West Bengal with the male - female ratio being 1.16, 1.37, 1.08 and 1.15 respectively (Fig. 8.2). The number of females was more in Andhra Pradesh, Gujarat and Kerala with the male-female ratio being 0.96, 0.98 and 0.94 respectively. The coastal states like Andhra Pradesh, Gujarat and Kerala had more females than males in households, compared to inland states like Delhi and Madhya Pradesh. Among coastal states Maharashtra and Gujarat also had households with more men than women.

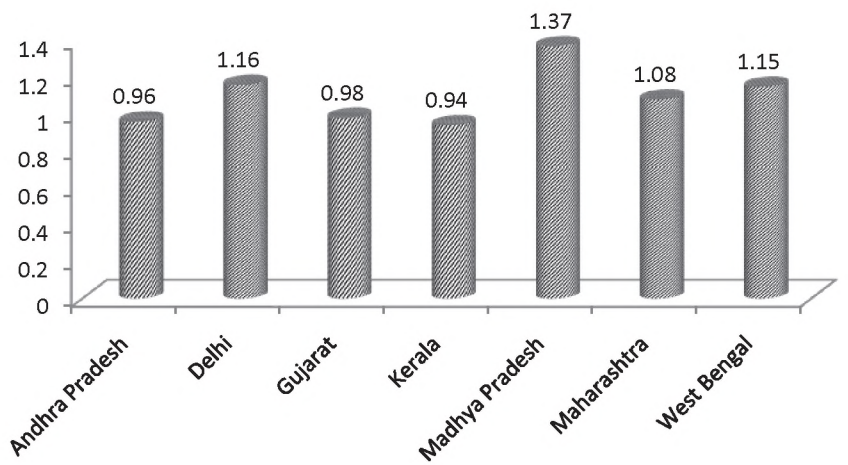


Figure 8.2: Male-female ratio of the respondent households

(iii) Family size

The family size of respondent households is given in Table 8.6. It can be observed that, 64.51 per cent of the families are in the size group 2-4, indicating that the small family norm has been widely adopted in the households engaged in marketing and processing of fish. 29.32 per cent of families fall in the family size group of 5-6 and the rest in the other size groups. In 4.01 per cent of the households there was only one member in the family. The overall average family size was 4.03.

Table 8.6: Family size of the respondent households in post- harvest sector (Number)

States	Family Size					To-tal	Average family size
	1	2-4	5-6	7-10	>10		
Andhra Pradesh	19 (9.64)	15 (80.20)	19 (9.64)	1 (0.51)	0 (0.00)	197	3.01
Delhi	1 (2.00)	32 (64.00)	16 (32.00)	1 (2.00)	0 (0.00)	50	3.84
Gujarat	4 (4.00)	59 (59.00)	36 (36.00)	1 (1.00)	0 (0.00)	100	4.00
Kerala	1 (0.99)	61 (60.40)	36 (35.64)	3 (2.97)	0 (0.00)	101	4.06
Madhya Pradesh	1 (2.00)	31 (62.00)	18 (36.00)	0 (0.00)	0 (0.00)	50	4.22
Maharashtra	0 (0.00)	53 (53.00)	42 (42.00)	5 (5.00)	0 (0.00)	100	4.41
West Bengal	0 (0.00)	24 (48.00)	23 (46.00)	2 (4.00)	1 (2.00)	50	4.64
Total	26 (4.01)	418 (64.51)	190 (29.32)	13 (2.01)	1 (0.15)	648	4.03

Figures in parenthesis indicate percentage to total

In 80.20 per cent households in Andhra Pradesh, 64.00 per cent in Delhi, 59.00 per cent in Gujarat, 60.40 per cent in Kerala, 62.00 per cent in Madhya Pradesh, 53.00 per cent in Maharashtra and 48.00 in West Bengal the family size was 2-4 members. The average family size was 3.01 in Andhra Pradesh, 3.84 in Delhi, 4.00 in Gujarat, 4.06 in Kerala, 4.22 in Madhya Pradesh, 4.41 in Maharashtra and 4.64 in West Bengal (Fig. 8.3)

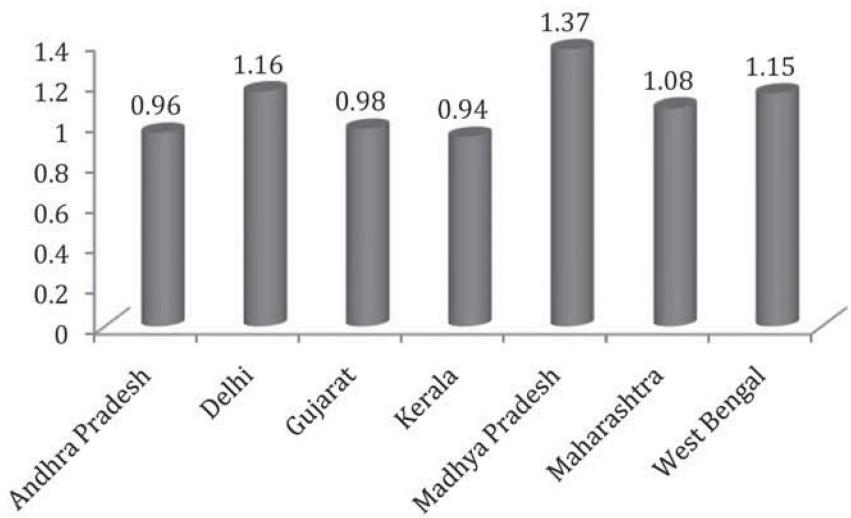


Figure 8.3: Family size of respondent households

(iv) Age composition

The age composition of the respondent households is represented in Table 8.7. The age composition is represented by adults (more than 15 years) and children (less than 15 years). The male- female ratio of the adult group (>15 years) was found to be 1.05:1.00 whereas the same for the children (<15 years) was found to be 1.07:1.00. Adult females in the age group of above 15 year outnumber the males in Gujarat and Kerala, while in all other states the number of females was less than the males. Female children were more than male children in the state of Gujarat.

The percentage of adult male was most in Madhya Pradesh (67.71 per cent) followed by Delhi (54.41 per cent), West Bengal (52.83 per cent) and Andhra Pradesh (50.10 per cent). Females were more in Kerala (51.95 per cent) and Gujarat (50.57 per cent). Male children were more in most states except Gujarat (50.36 per cent) and the male and female children were equal in Andhra Pradesh.

Table 8.7: Age composition of the respondent households in post- harvest sector (Number)

States	Adult (> 15 years)		Children (< 15 years)		Total		Adult-Child Ratio
	Male	Female	Male	Female	Male	Female	
A.P	252 (50.10)	251 (49.90)	45 (50.00)	45 (50.00)	297	296	5.59
Delhi	74 (54.41)	62 (45.59)	29 (51.79)	27 (48.21)	103	89	2.43
Gujarat	130 (49.43)	133 (50.57)	68 (49.64)	69 (50.36)	198	202	1.92
Kerala	160 (48.05)	173 (51.95)	39 (50.65)	38 (49.35)	199	211	4.32
Madhya Pradesh	87 (59.18)	60 (40.82)	35 (54.69)	29 (45.31)	122	89	2.30
Maharashtra	201 (51.67)	188 (48.33)	28 (53.85)	24 (46.15)	229	212	7.48
West Bengal	84 (52.83)	75 (47.17)	40 (54.79)	33 (45.21)	124	108	2.18
Total	904 (51.04)	867 (48.96)	244 (51.26)	232 (48.74)	1148	1099	3.52

Figures in parenthesis indicate percentage to total

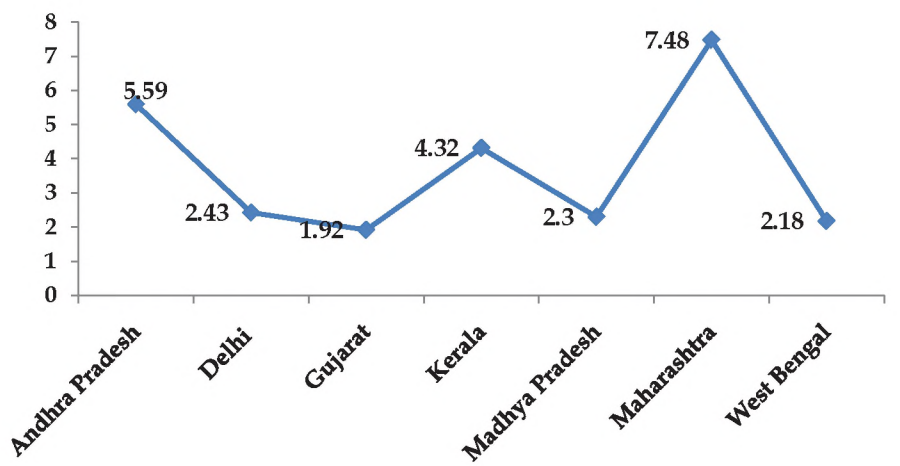


Fig 8.4: Adult – child ratio in respondent households

The adult-child ratio is given in Fig 8.4. It can be observed that the ratio is highest in Maharashtra (7.48) and least for Gujarat (1.92). For other states it is 4.31 for Kerala, 2.43 for Delhi, 2.30 for Madhya Pradesh and 2.18 for West Bengal.

Table 8.8: Male- Female Ratio

States	Adult (M-F ratio)	Children (M-F ratio)	Male-Female ratio
Andhra Pradesh	1.00	1.00	0.94
Delhi	1.19	1.07	0.98
Gujarat	0.98	0.99	1.08
Kerala	0.92	1.03	1.15
Madhya Pradesh	1.45	1.21	0.96
Maharashtra	1.07	1.17	1.16
West Bengal	1.12	1.21	1.37
Total	1.05	1.07	1.04

The male female ratio among the adult and children is indicated inTable 8.8 and Figure 8. 5. It can be noticed that the male – female ratios among the adult and children is favourable to the male in most states like Delhi, Madhya Pradesh, Maharashtra and West Bengal. In Kerala and Gujarat it is favourable to females in adults and in the case of children, it is favourable only in Gujarat.

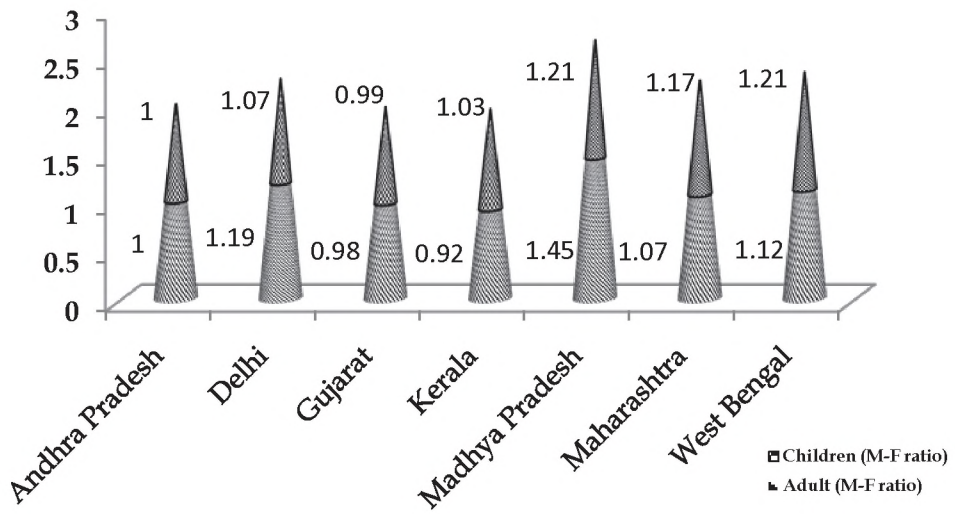


Fig. 8.5: Male-Female ratio among adults and children of respondent households

B. Literacy status

The level of literacy among persons in the allied sectors of fish marketing and processing was studied by assessing the level of literacy among respondents and their access to educational institutions.

(i) Literacy Status

The level of literacy as observed from participation in school and college education is given in Table 8.9. The primary level indicated schooling till fourth grade, secondary level indicated by high school, secondary and vocational education. The collegiate level of education was denoted by collegiate and professional education.

On the whole, 19.35 per cent of the respondents were illiterate, while the rest 80.65 per cent had acquired some form of literacy. The percentage of illiterates was more in Andhra Pradesh (36.26 per cent), followed by Madhya Pradesh (29.17 per cent), Delhi (20.50 per cent), West Bengal (17.65 per cent), Gujarat (15.08 per cent) and least for Kerala (4.19 per cent).

The literacy rate is given in fig 6, and it can be observed that it is highest in Kerala (95.81 per cent) and lowest for Andhra Pradesh (63.74 per cent).

The maximum number of respondents studied upto the secondary level (46.92 per cent) and the rest upto primary (17.65 per cent) level. Only 6.33 per cent of the respondents have gone upto the college level. A maximum of 27.44 per cent of respondents from Maharashtra have gone to college while this percentage is less than 10 in all other states.

In general, persons engaged in marketing and processing have better literacy skills than in other sectors as they deal with consumers and work in processing factories where education is an added advantage to their trade.

Table 8.9: Education of respondent households in post- harvest sector - Continuing and Dropout (Number)

States	Illiterate	Literate	Primary Level	Second-ary Level	Collegiate Level	Total	Literacy Rate
Andhra Pradesh	215 (36.26)	378	56 (9.44)	287 (48.40)	35 (5.90)	593	63.74
Delhi	33 (20.50)	128	106 (65.84)	8 (4.97)	14 (8.70)	161	79.50
Gujarat	57 (15.08)	321	131 (34.66)	173 (45.77)	17 (4.50)	378	84.92
Kerala	17 (4.19)	389	97 (23.89)	257 (63.30)	35 (8.62)	406	95.81
Madhya Pradesh	56 (29.17)	136	73 (38.02)	52 (27.08)	11 (5.73)	192	70.83
Maharashtra	45 (10.20)	396	56 (12.70)	219 (49.66)	121 (27.44)	441	89.80

West Bengal	39 (17.65)	182	39 (17.65)	124 (56.11)	14 (6.33)	221	82.35
Total	462 (19.35)	1930	558 (23.38)	1120 (46.92)	247 (10.35)	2387	80.69

Figures in parenthesis indicate percentage to total

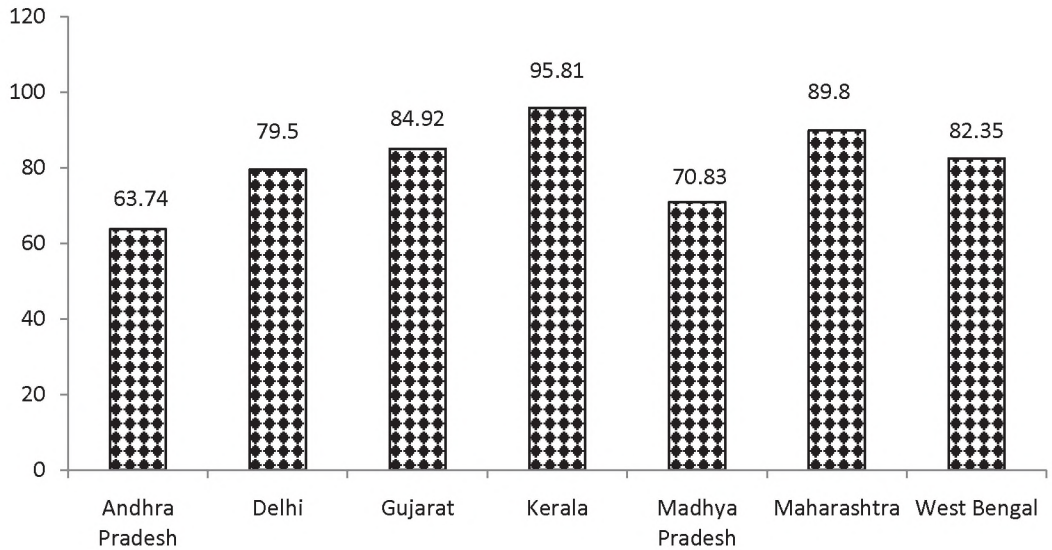


Fig 8.6: Literacy rate of fishers involved in post harvest fisheries sector in states

(ii) Educational status

The information on education of the respondents in terms of continuance and discontinuance of education is given in Table 8.10.

The dropouts were more at secondary level of education with 73.26 per cent ranging from 100 per cent in Delhi and 46.97 per cent in Maharashtra Fig 8.7. The dropout at primary level of education was about 18.25 per cent ranging from 40.86 per cent in Gujarat to 1.52 per cent in Maharashtra. Though the number of collegiate was high in Maharashtra, the drop out rate was also high at 51.52 per cent.

The continuing-drop out ratio was 0.99 on the whole and it was 1.76 for Maharashtra, followed by 0.69 for Gujarat, 0.57 for West Bengal, 0.35 for Madhya Pradesh, 0.34 for Kerala, 0.69 for Gujarat and 0.24 for Delhi (Fig. 8.8).

Maharashtra rated the highest in the schooling rate of children among other states including Kerala where the literacy rates were higher. The demonstration benefit of education is probably a reason for this. Better steps have to be initiated to retain children in school. Initiatives like the mid-day meal are to be made more wide spread.

Table 8.10: Literacy Profile of the respondent families in post- harvest sector (Number)

States	Continuing	Drop outs				Con-tinuing - Drop out ratio
		Primary	Secondary	Collegiate	Total	
Andhra Pradesh	360	NA	NA	NA	NA	-
Delhi	25	0	103 (100.00)	0	103	0.24
Gujarat	64	38 (40.86)	51 (54.84)	4 (4.30)	93	0.69
Kerala	98	64 (21.99)	212 (72.85)	15 (5.15)	291	0.34
Madhya Pradesh	35	39 (38.61)	49 (48.51)	13 (12.87)	101	0.35
Maharashtra	116	1 (1.52)	31 (46.97)	34 (51.52)	66	1.76
West Bengal	71	0 (0.00)	124 (100.00)	0 (0.00)	124	0.57
Total	769	142 (18.25)	570 (73.26)	66 (8.48)	778	0.99

Figures in parenthesis indicate percentage to total

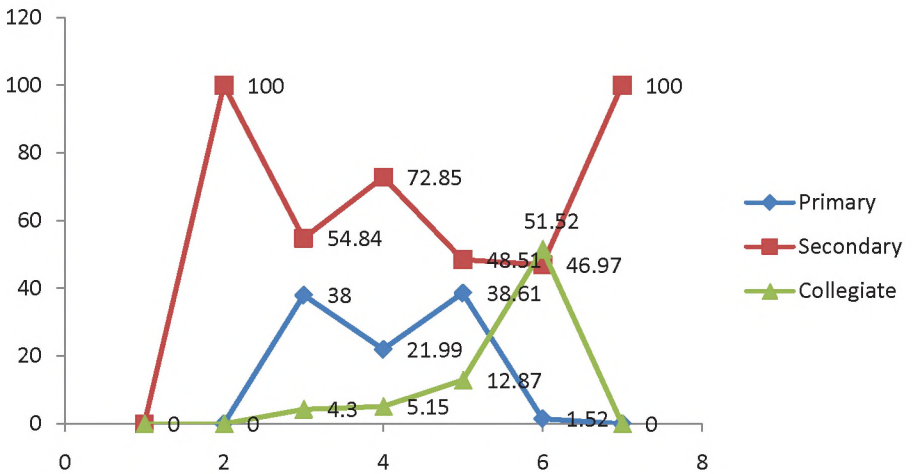


Fig. 8.7: Drop-out at various stages of education among respondents

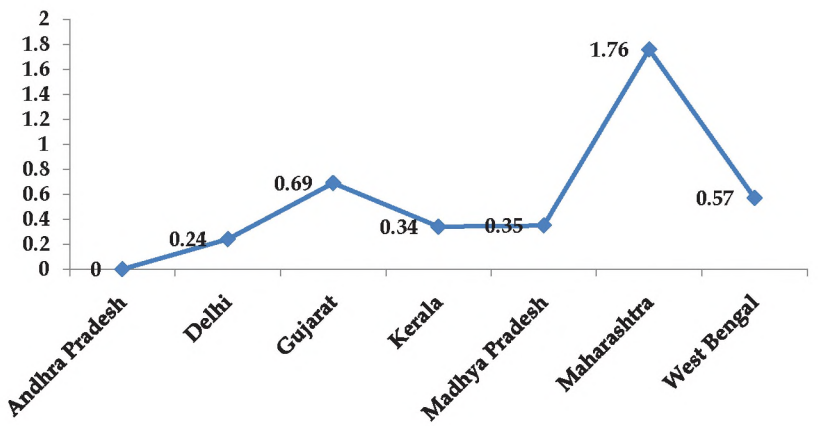


Fig 8. 8: Continuing-drop out ratio among respondents in various states

(iii)Access to educational institutions

Access to education is of primary importance in ensuring a literate population. The access to educational institutions by persons engaged in allied activities like marketing and processing of fish were studied by assessing the distance to educational institution. The average distance to primary school was 1.41 km and to high school was 3.00 km (Table 8. 11). Colleges were available at a distance of 8.73 km and professional colleges at a distance of 11.90 km.

Educational institution were available within a radius of 6.26 km in all the states studied. In Gujarat the range was 10.42 km, in Kerala 9.995 km, in Delhi 7.42 km, in Andhra Pradesh 4.86 km, in West Bengal 4.64 km, in Maharashtra 4.51 km and in Madhya Pradesh it was 2.03 km. Primary schools were available within a distance of 0.67 km in West Bengal to 2.10 km in Andhra Pradesh, secondary school within a distance of 1.50 km in Madhya Pradesh to 6.61 km in Gujarat, colleges within a distance of 2.60 km in Madhya Pradesh to 15.29 km in Gujarat and professional colleges within a distance of 3.20 km in Madhya Pradesh to 23.14 km in Kerala (Fig. 8.9).

Thus it is clear that the access to education is good for all the families engaged in fish marketing and processing.

Table 8.11: Access to education post-harvest sector (km)

States	Distance to nearby educational institution (in km)				Total
	Primary School	High School	College	Professional	
Andhra Pradesh	2.10	2.70	4.70	9.95	4.86
Delhi	1.20	2.30	11.32	14.86	7.42
Gujarat	1.94	6.61	15.29	17.82	10.42
Kerala	2.11	3.68	10.88	23.14	9.95
Madhya Pradesh	0.80	1.50	2.60	3.20	2.03
Maharashtra	1.07	2.66	9.29	5.00	4.51
West Bengal	0.67	1.52	7.04	9.34	4.64
Average	1.41	3.00	8.73	11.90	6.26

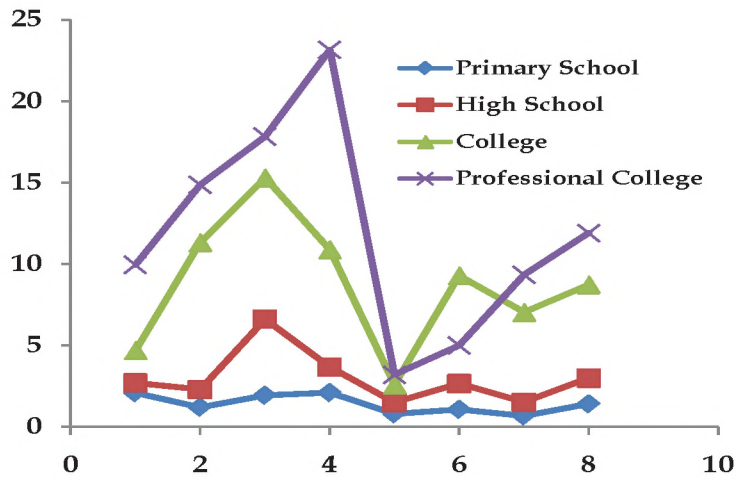


Fig 8.9: Literacy rate of persons involved in post harvest fisheries sector in states

C. Health status of respondent households

Health is another social factor which is very important to ensure the well being of the population. The health status of person engaged in allied post harvest activities in fisheries like marketing and processing was studied through making observations regarding vaccination regime, discontinuation of vaccinations, birth weight of infants, incidence of maternal and child mortality, incidence of common diseases and special ailments including lifestyle diseases. Disease management aspects like access to health care; and problems and suggestions for better health care facilities were also studied.

(i) Vaccination regime of infants / children (less than 15 years)

The average age of administration of vaccination and incidence of discontinuation among infants/children with age less than 15 years in the selected states of India is given in Table 8.12.

The vaccination for Pox, BCG, MMR and Polio were regularly taken by all the families covered under the study. The average age at which the vaccination for pox was given to the child was between 1 day and 5 years for different types of vaccinations. No instance of discontinuation of vaccinations was observed in the states studied. Consistent campaigns by Government regarding the health benefits of vaccinations have had an impact in the community.

Table 8.12. Vaccination regime of infants / children (less than 15 years) – Average age of administration and incidence of discontinuation (Post- harvest)

States	Average age of administration and incidence of discontinuation (percentage)									
	Pox		BCG		MMR		Polio		Others	
	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)
Andhra Pradesh	-	0.00	6 Wks	0.00	9-12 mts	0.00	6 Wks	0.00	9-12 Wks	0.00
Delhi	-	-	-	-	-	-	-	-	-	-
Gujarat	1 day – 5 years	0.00	1 day – 5 years	0.00	1 day – 5 years	0.00	1 day – 5 years	0.00	1 day – 5 years	0.00
Kerala	0.60	0.00	0.30	0.00	0.62	0.00	3.80	0.00	-	-
Madhya Pradesh	1	0.00	1	0.00	1	0.00	Upto 5 yrs	0.00	0	0.00
Maharashtra	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West Bengal	10 months	0.00	1 Month	0.00	18 month	0.00	Upto 5years	0.00	Nil	0.00
Total	1 day – 5 years	0.00	1 day – 5 years	0.00	1 day – 5 years	0.00	1 day – 5 years	0.00	9 weeks - 5 years	0.00

Normally Polio administration continues till the age of 5 years

(ii) Birth weight of infants

The birth weight of infants in households engaged in post-harvest sector is given in Table 8.13 and Fig 8. 10. The average birth weight of males was 2.77 kg and that of females was 2.58 kg. The birth weight ranges from 2.32 kg in Maharashtra to 3.06 kg in Delhi. In most states the birth weight of male children was higher than that of female children

Table 8.13: Birth weight of infants (Post- harvest)

States	Weight (kg)		
	Male	Female	Total
Andhra Pradesh	3.00	2.50	2.75
Delhi	3.14	2.97	3.06
Gujarat	2.93	2.59	2.76
Kerala	2.89	2.65	2.77
Madhya Pradesh	2.40	2.40	2.40
Maharashtra	2.39	2.26	2.32
West Bengal	2.65	2.71	2.68
Average	2.77	2.58	2.68

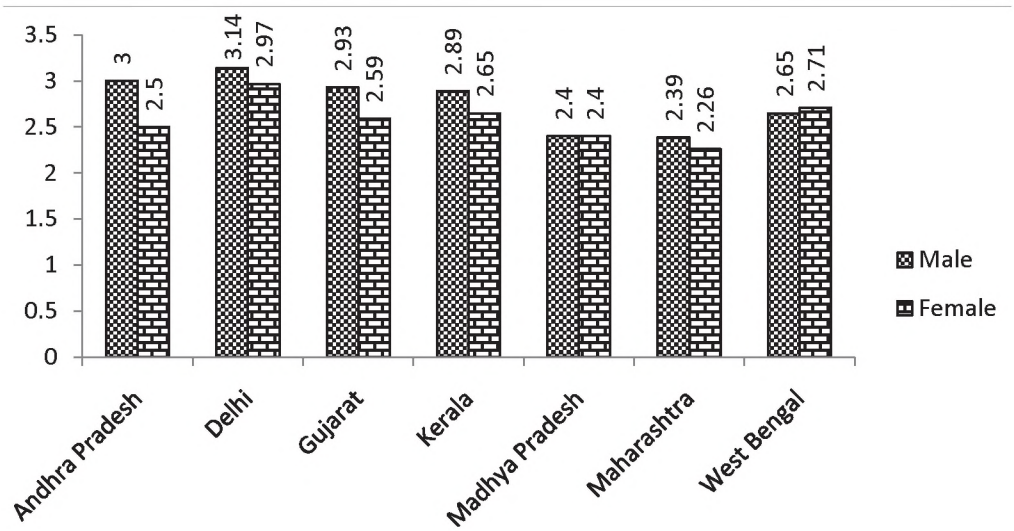


Fig. 8.10: Birth weight of infants of respondent households

(iii) Incidence of mortality among mother/ child during birth

The maternal and child mortality figures are presented in Table 8.14. In all 5 cases of maternal mortality 3 from Delhi and one each from Gujarat and Madhya Pradesh was reported. 10 child mortality cases were also recorded, four in Gujarat, two each in Delhi and Maharashtra and one each in Andhra Pradesh and Madhya Pradesh.

The reasons for maternal mortality were excessive bleeding post-delivery and in the case of children it was jaundice and pre mature delivery.

Table8.14: Incidence of mortality among mother/child during birth (Number) (Post- harvest)

States	No of delivery	Mortality of mother/ child during birth				
		Mother	Reason	Child	Reason	Total
Andhra Pradesh	NA	0	0	1	Jaundice	1
Delhi		3	-	2	-	5
Gujarat	72	1	Excessive bleeding	4		5
Kerala	9	0	0	0	0	0
Madhya Pradesh		1 (2.00)	Not known	1 (2.00)	Not known	2 (4.00)
Maharashtra	NA	0	0	2	PMD	2
West Bengal		-	-	-	-	-
Total		5	-	10	-	15

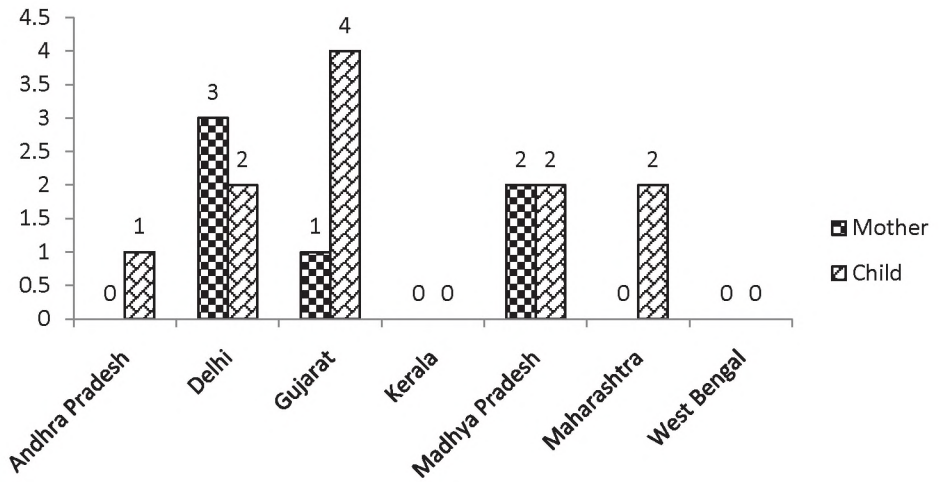


Fig 8.11: Maternal and child mortality cases in respondent households

(iv) Incidence of diseases among adults

The incidence, frequency, and previous occurrence of diseases among the adult family members of the respondents from the post harvest fisheries sector, engaged in allied activities of marketing and processing, across the states are discussed in the Table 8.15 and 8.16.

The average annual frequency was found to be 1.10 and 1.51 respectively for males and females.

The most frequently occurring health problems were fever and body aches. Diahorrea, gastroenteric disorders were also reported with a frequency of 1.73 and 1.62 for males and 1.63 and 1.13 for females respectively. Reproductive disorders were reported by females with the frequency being 0.71. This could be higher as women usually suppress such information. Skin disorders have occurred to the tune of 1.23 times for men and 1.55 times for women. Skin problems, especially in the hands, are commonly found in seafood processing workers

due to constant exposure to cold conditions. Special ailments/conditions like cardiac failure, TB, anaemia and others have also been reported.

Across the states, the trends are similar with fever and flu dominating the disease occurrence. Special ailments like cardiac failure and TB was reported from Gujarat, Maharashtra and West Bengal. Anaemia was also reported in Madhya Pradesh besides the above states. Blood Pressure was reported in one case in West Bengal. No cases of AIDS were reported. It is also important to note that no case of diabetes was reported which is a rapidly spreading life style disease in many states.

Previous occurrence of health problems also indicate that the commonly occurring diseases were fever and flu, body aches, diahorrea, gastro enteric diseases and skin diseases. Occurrence of skin diseases was more with a frequency of 1.94 in males and 2.05 in females. Reproductive disorders were also reported by females.

The frequency of special ailments was 1.00 for cardiac failure in males, 2.73 and 0.54 for males and females for TB and 1.14 and 1.36 for males and females for anaemia.

Table 8.15: Incidence of diseases among adult (Male and Female) - Annual frequency (Post- harvest)

Sl. No.	Diseases	Andhra Pradesh		Delhi		Gujarat		Kerala		Madhya Pradesh		Maharash-tra		West Bengal		Total	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
	(i) Common Diseases																
1.	Fever/ Flu	1.67	1.85	2.00	1.75	3.68	3.75	2.52	2.75	3.25	2.75	1.60	1.75	1.45	1.65	2.31	2.32
2.	Body aches	Nil	Nil	Nil	Nil	2.00	2.50	4.15	4.05	Nil	Nil	1.47	1.27	1.50	1.70	2.28	2.38
3.	Diahorrea	Nil	Nil	Nil	Nil	3.45	3.25	Nil	Nil	Nil	Nil	0.75	0.66	1.00	1.00	1.73	1.63
4.	Gastro enteric disease	Nil	Nil	Nil	Nil	0.60	1.00	1.20	0.60	Nil	Nil	0.83	0.66	3.88	2.25	1.62	1.13
5.	Skin disorder	Nil	Nil	Nil	Nil	0.5	Nil	0.60	2.00	Nil	Nil	0.66	1.10	2.00	Nil	1.23	1.55
6.	Reproductive disor-der	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.20	Nil	Nil	Nil	0.72	Nil	1.20	0.00	0.71
	(ii) Special Ailments																
7.	Cardiac failure	Nil	Nil	Nil	Nil	1.00	Nil	Nil	Nil	Nil	Nil	0.33	Nil	1.00	Nil	0.77	0.00
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	0.20	Nil	Nil	Nil	0.33	0.33	1.00	Nil	0.51	0.33
9.	Anaemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.20	Nil	Nil	0.66	0.66	Nil	1.17	0.66	0.68
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1.00	1.52	1.00	1.52
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
13.	Others*	Nil	Nil	Nil	Nil	Nil	Nil	1.40	0.60	Nil	Nil	0.70	0.33	1.42	1.63	1.17	2.56
	Total	1.67	1.85	2.00	1.75	1.87	2.63	1.73	1.49	3.25	2.75	0.78	0.83	1.58	1.52	1.10	1.51

Table 8.16: Incidence of diseases among adult (Male and Female) Previousoccurrence

Sl. No.	Diseases	Andhra Pradesh		Delhi		Gujarat		Kerala		Madhya Pradesh		Maharash-tra		West Bengal		Total	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
	(i) Common Diseases																
1.	Fever/ Flu	0.96	1.00	1.25	1.50	1.57	1.00	3.03	2.84	1.60	1.60	2.35	3.04	1.90	1.75	1.81	1.82
2.	Body aches	0.03	0.05	0.95	0.86	Nil	Nil	1.95	1.56	3.0	Nil	2.51	2.54	Nil	1.00	1.69	1.20
3.	Diahorrea	Nil	Nil	Nil	Nil	0.58	3.42	0.60	1.20	Nil	1.00	3.00	0.77	1.00	1.00	1.30	1.48
4.	Gastro enteric disease	Nil	Nil	Nil	Nil	0.57	1.50	0.46	0.60	1.2	1.3	1.75	1.83	Nil	1.50	1.00	1.35
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	3.15	1.40	1.0	1.0	1.66	3.75	Nil	Nil	1.94	2.05
6.	Reproductive disor-der	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1.20	Nil	Nil	Nil	1.16	Nil	Nil	0.00	1.18
	(ii) Special Ailments																
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1.00	Nil	1.66	Nil	Nil	Nil	1.33	0.00
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	4.80	Nil	1.00	Nil	0.66	0.54	Nil	Nil	2.73	0.54
9.	Anaemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.40	1.00	1.00	1.33	2.30	1.10	1.75	1.14	1.36
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
13.	Others*	Nil	Nil	Nil	Nil	1.5	Nil	0.60	0.40	1.5	1.8	2.70	0.33	Nil	Nil	1.58	0.84
	Total	0.50	0.53	1.10	1.18	0.91	1.97	2.08	1.20	1.41	1.28	1.96	1.99	1.33	1.40	1.12	0.91

(v) Incidence of diseases among children

The previous occurrence of diseases among children is discussed in Table 8.17 and 8.18.

Fever and flu are the most common ailments among children with a frequency of 1.99 for males and 2.08 for females. This was followed by Diahorrea with incidence reported at 1.05 for males and 0.89 for females. Gastro enteric disorders and skin diseases were also reported. One case of heart ailment, TB and anaemia was reported from Gujarat. Anaemia was also reported from Maharashtra and West Bengal.

Table 8.17: Incidence of diseases among children (Male and Female) - Annual frequency (Post- harvest)

Sl. No.	Diseases	Andhra Pradesh		Delhi		Gujarat		Kerala		Madhya Pradesh		Maharash-tra		West Bengal		Total	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
	(i) Common Diseases																
1.	Fever/ Flu	1.81	2.94	1.75	1.62	2.70	2.05	3.27	3.34	1.50	1.50	1.00	1.00	1.90	1.75	1.99	2.03
2.	Body aches	Nil	Nil	Nil	Nil	Nil	0.50	Nil	0.20	Nil	Nil	1.00	0.66	Nil	1.00	1.00	0.59
3.	Diahorrea	Nil	Nil	Nil	Nil	1.50	1.70	0.20	0.20	1.5	Nil	Nil	0.66	1.00	1.00	1.05	0.89
4.	Gastro enteric disease	Nil	Nil	Nil	Nil	0.60	0.65	Nil	Nil	Nil	Nil	1.33	0.33	Nil	0.33	0.97	0.44
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.20	1.00	1.00	0.33	0.33	Nil	Nil	0.67	0.51
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	(ii) Special Ailments																
7.	Cardiac failure	Nil	Nil	Nil	Nil	0.33	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.33	0.00
8.	TB	Nil	Nil	Nil	Nil	0.33	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.33	0.00
9.	Anaemia	Nil	Nil	Nil	Nil	0.33	Nil	Nil	Nil	Nil	Nil	Nil	1.00	1.00	1.50	0.67	1.25
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	BloodPresure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	Nil	Nil	Nil	2.33	Nil	Nil	Nil	Nil	1.00	0.33	1.25	2.50	1.25	1.72	1.17
	Total	1.81	2.94	1.75	1.62	1.35	1.23	1.74	0.99	1.33	1.17	0.72	0.75	1.60	1.14	0.90	0.98

(others include Thyroid, Sinus)*

Table 8.18: Incidence of diseases among children (Male and Female) - Previous occurrence (No: of months) (Post- harvest)

Sl. No.	Diseases	Andhra Pradesh		Delhi		Gujarat		Kerala		Madhya Pradesh		Maharash-tra		West Bengal		Total	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
	(i) Common Diseases																
1.	Fever/ Flu	1.60	1.80	1.86	1.90	Nil	Nil	2.32	2.01	3.90	3.70	2.67	2.32	2.26	2.81	2.44	2.42
2.	Body aches	Nil	Nil	Nil	Nil	0.50	Nil	Nil	0.20			1.33	0.50	Nil	0.75	0.92	0.49
3.	Diahorrea	Nil	Nil	Nil	Nil	1.50	2.75	0.20	0.40	1.00	4.00	Nil	1.00	1.50	2.75	1.05	2.18
4.	Gastro en-teric disease	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.66	1.22	Nil	1.00	0.66	1.11
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.40	2.00	2.00	0.33	2.33	Nil	Nil	1.17	1.58
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.66	Nil	Nil	0.00	0.66
	(ii) Special Ailments																
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
9.	Anaemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
11.	Blood Pres-sure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.00	0.00
13.	Others*	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	4.00	Nil	Nil	Nil	Nil	0.00	4.00
	Total	1.60	1.80	1.86	1.90	1.00	2.75	1.26	0.75	2.30	3.23	1.25	1.34	1.88	1.83	1.04	1.41

(others include Thyroid, Sinus)*

Previous occurrences were also that of the common health problems like fever and flu, diarhoea, gastro enteric problems and skin disorders.

(vi) Access to health care

The access to health care as observed from the distance to nearest primary health centre (PHC) and hospital is given in Table 8.19. Results show that the nearest PHC is at a distance of 2.68 km and the nearest hospital at a distance of 6.63 kms on an average. For different states it was 1.00 km and 2.00 km for Andhra Pradesh, 2.15 km and 1.00 km for Delhi, 5.79 km and 12.59 km for Gujarat, 3.34 km and 11.52 km for Kerala, 2.00 km and 2.8 km for Madhya Pradesh, 1.60 km and 7.71 km for Maharashtra and 2.90 km and 8.82 km for West Bengal (Fig 8.12).

It is important to note that atleast a PHC is available within a distance of 1 to 6 km in all states and the maximum distance to a hospital is around 13 km. Fairly good health care facilities are available to the households engaged in allied fisheries activities like marketing and processing.

Table 8.19: Access to health care - Post-harvest sector (km)

States	Primary Health Centre	Hospital
Andhra Pradesh	1.00	2.00
Delhi	2.15	1.00
Gujarat	5.79	12.59
Kerala	3.34	11.52
Madhya Pradesh	2.00	2.80
Maharashtra	1.60	7.71
West Bengal	2.90	8.82
Total	2.68	6.63

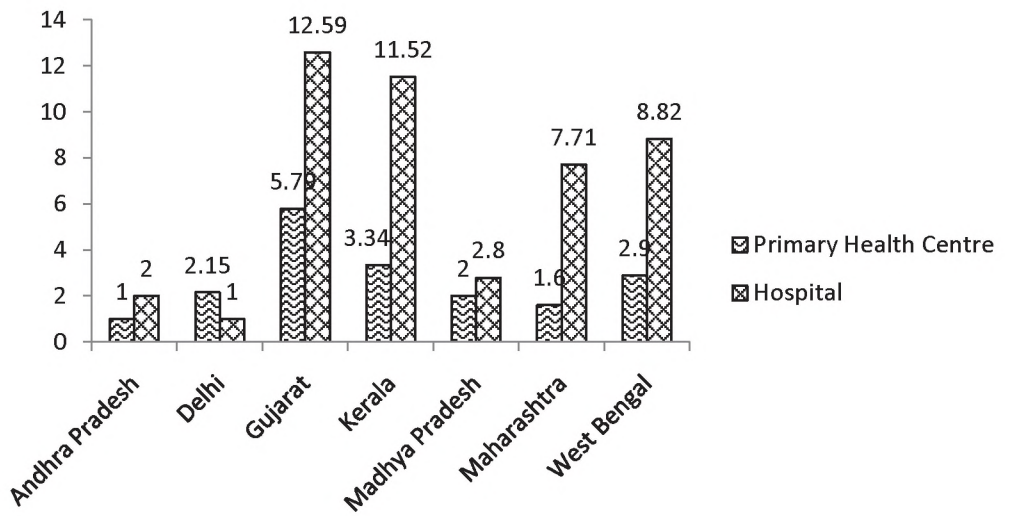


Fig 8.12: Access to nearest PHC/hospital

(vii) Problems in health management

The major problems in health management of respondent households were assessed based on opinions collected from the respondents.

The major reasons suggested include,non- availability of specialist and paramedicines in health centres (26.77 per cent), difficulty in accessing the hospital due to distance (16.67 per cent mainly in Gujarat and Kerala where the distance to hospitals was longer), lack of adequate effective medicines (15.15 per cent), poor infrastructure (10.86 per cent), problems on cleanliness/sanitation (8.59 per cent) and drinking water problem (5.56 per cent) (Table 8.20, Fig.8.13).

Table 8.20. Problems in health management (Frequency) (Post- harvest)

Sl. No	Problems	AP	Delhi	Guj	Ker	MP	Mah	WB	Total	Per cent to total
1.	Difficulty in accessing the hospital due to distance	0	0	27	20	0	4	15	66	16.67
2.	Non availability of specialist and paramedics in health centers	0	0	1	8	50	0	47	106	26.77
3.	Poor infrastructure	0	0	5	28	0	0	10	43	10.86
4.	Lack of adequate effective medicines	0	0	0	18	0	0	42	60	15.15
5.	Problems on Cleanliness/ Sanitation	0	0	0	34	0	0	0	34	8.59
6.	Drinking water problem	1	0	0	21	0	0	0	22	5.56
7.	Work related stress	1	0	0	0	0	0	0	1	0.25
8.	Others	0	0	64	0	0	0	0	64	16.16
9.	Total	2	0	97	129	50	4	114	396	100.00

Non-availability of medicines was the major reason in Madhya Pradesh, while poor infrastructure, lack of effective medicines, lack of cleanliness and sanitation and drinking water issues were the problems highlighted in Kerala.

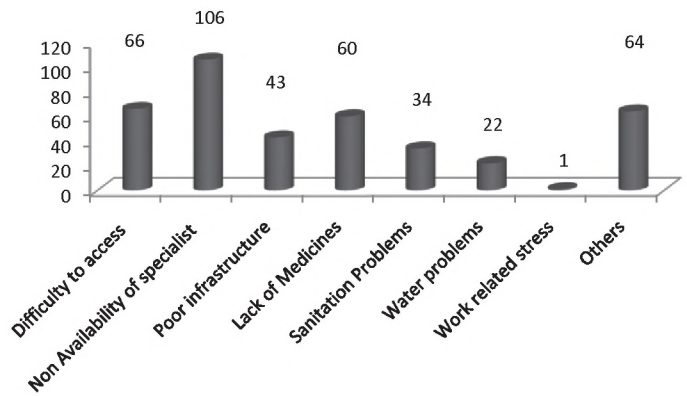


Fig 8.13: Problems in health management of respondents

(viii) Suggestions to improve healthcare facilities

Suggestions on improving health care facilities were obtained from the respondents and are given in Table 8.21 and Figure 8.14.

The most important suggestion was to make available sufficient medicines for all diseases free of cost which was stated by 37.65 per cent of respondents. The next suggestion was to construct modern hospitals with all infrastructural facilities and health care (21.18 per cent) and to provide facilities for doctors in these centres so that they are available round the clock (18.43 per cent). The other suggestions include increasing the number of doctors and specialist (10.59 per cent), drinking water facilities in hospitals (9.80 per cent) and provision of ambulances in case of emergencies (2.35 per cent).

Table 8.21 Suggestions to improve health care facilities (Frequency) (Post- harvest)

Sl. No:	Suggestions	AP	Delhi	Guj	Ker	MP	Mah	WB	Total	Per cent to total
1.	Increase the number of doctors/ specialists	0	0	4	4	0	4	15	27	10.59
2.	Make quarters facility for doctors so that they are available 24 x 7	0	0	0	0	0	0	47	47	18.43
3.	Make available sufficient medicines for all diseases with free of cost	0	0	0	36	50	0	10	96	37.65
4.	Construct the modern hospital with all infrastructure and health care facilities.	0	0	8	4	0	0	42	54	21.18
5.	Provide ambulance for emergency (especially during delivery accidents, etc.)	0	0	0	6	0	0	0	6	2.35
6.	Need good drinking water facility	0	0	0	25	0	0	0	25	9.80
7.	Total	0	0	12	75	50	4	114	255	100.00

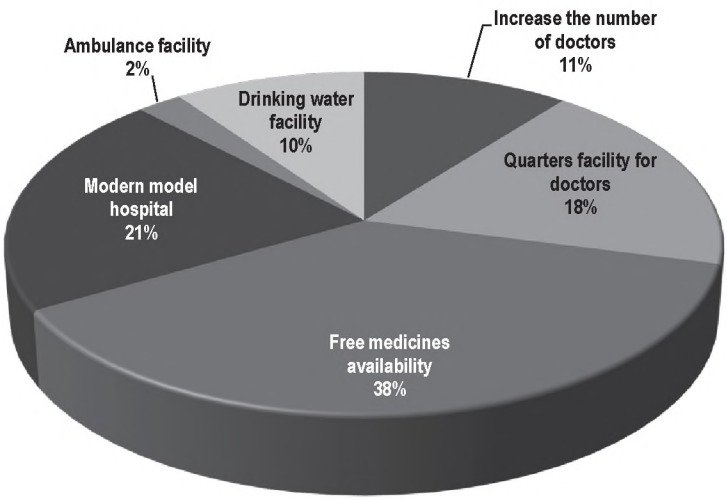


Fig 8.14: Suggestions to improve health care

The respondents in Kerala and Madhya Pradesh (89.58 per cent) opined that sufficient medicines must be made available in hospitals, while respondents from West Bengal wanted modern hospitals and more number of doctors and specialists.

D. Income status

The income profiling of the respondent households was done by looking at the monthly income patterns of respondent households, their expenditure patterns, savings and indebtedness and credit sources and uses.

(i) Monthly income pattern

The income pattern of the respondent households that are engaged in marketing and processing of fish is given in Table 8.22.

The major income sources were classified into fishery related, labor, agriculture, business and others. The highest monthly average income generated by the total respondents were through fisheries sector with an average amount of Rs. 41057.40 (83.46 per cent of the total income) followed by income from labour sector at Rs. 5071.09 (10.31 per cent), other sectors at Rs. 1587.52 (3.23 per cent), business at Rs.1359.95 (2.76 per cent) and agricultural sector at Rs. 116.16 (0.24 per cent) (Fig. 8.15). The highest monthly income was observed in Maharashtra with 97.45 per cent of total income generated from fisheries alone.

Table 8.22: Income profile of the respondents (Rs./month) (Post-harvest)

States	Enterprise					
	Fishery	Labour	Agriculture	Business	Any others	Total
Andhra Pradesh	2115.15 (82.36)	201.92 (7.86)	0.00 (0.00)	251.15 (9.78)	0.00 (0.00)	2568.22
Delhi	3788.00 (90.45)	400.00 (9.55)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	4188.00
Gujarat	7436.02 (83.57)	1462.39 (16.43)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	8898.41
Kerala	3553.54 (61.76))	862.59 (14.99	116.16 (2.02)	634.40 (11.02)	587.52 (10.21)	5754.21
Madhya Pradesh	3700.00 (54.06)	2144.19 (31.33)	0.00 (0.00)	0.00 (0.00)	1000.0 (14.61)	6844.19
Maharashtra	18159.44 (97.45)	0.00 (0.00)	0.00 (0.00)	474.40 (2.55)	0.00 (0.00)	18633.84
West Bengal	2305.25 (100.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	2305.25
Total	41057.40 (83.46)	5071.09 (10.31)	116.16 (0.24)	1359.95 (2.76)	1587.52 (3.23)	49192.12

Figures in parenthesis indicate percentage to total

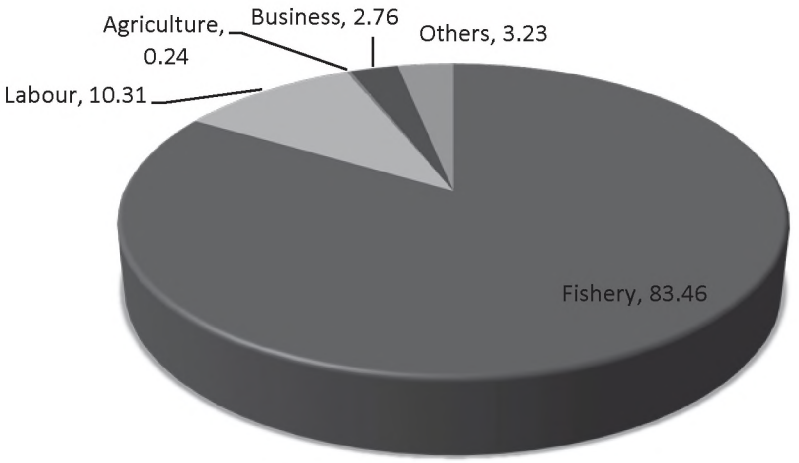


Fig. 8.15: Major sources of income

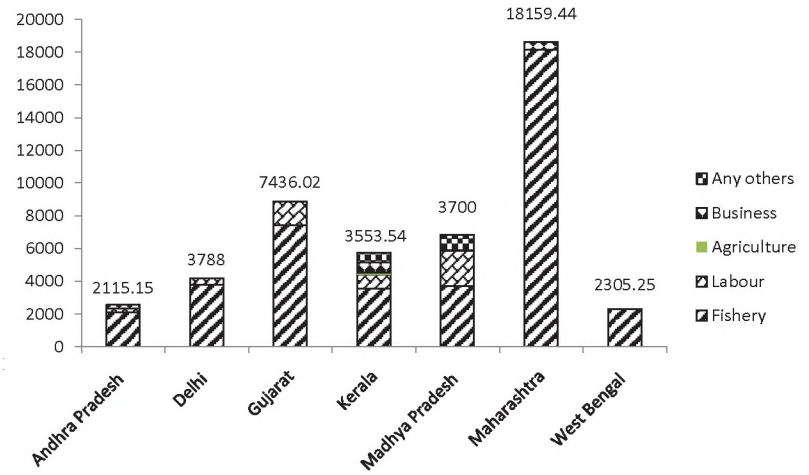


Fig. 8.16: Major sources of income across states

The lowest income in absolute term was registered at West Bengal with Rs. 2305.25. However, the state wise monthly income status of the respondents indicated that West Bengal state has the highest income from fisheries sector which contributed to cent per cent of the total income as the repondents mainly engaged in fisheries activity alone.

(ii) Involvement in non-fisheries activities

The Involvement of respondent' households in non fisheries activities are given in Table 8.23

Business is the most sought after income earning activity for 46.63 per cent of the respondents. 41.83 per cent of the respondents went as labour and 11.54 per cent carried out agriculture and other activities (Fig. 8.17). The major non-fishery related activity was business in Andhra Pradesh (41.24 per cent), Madhya Pradesh (51.55 per cent) and Maharashtra (17.53

Table 8.23. Respondents involvement in non-fisheries activities (Post- harvest)

States	Respondents involved in non-fisheries activities				
	Labour	Agriculture	Business	Any others	Total
Andhra Pradesh	0	0	40	0	40
Delhi	24	0	0	0	24
Gujarat	17	0	0	0	17
Kerala	46	4	7	20	77
Madhya Pradesh	0	0	50	0	50
Maharashtra	0	0	17	0	17
West Bengal	0	0	0	0	0
Total	87	4	97	20	208

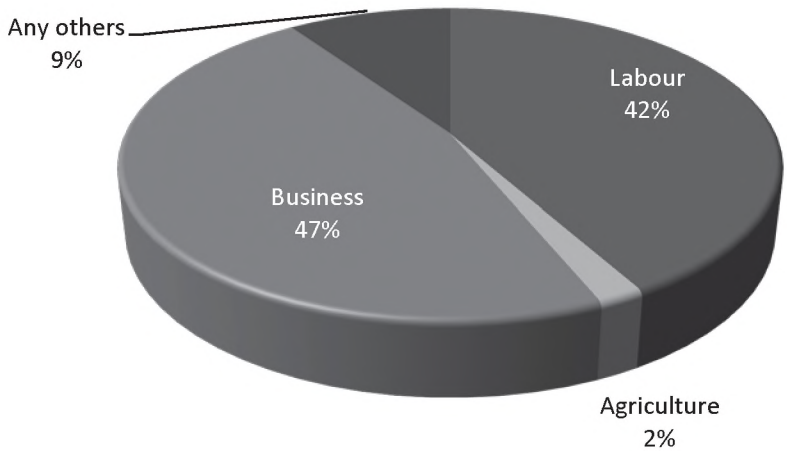


Fig 8.17: Non-fisheries related activities taken up

per cent). While in Delhi, Gujarat and Kerala 27.59, 19.54, 52.87 per cent of persons were engaged in labour respectively (Fig. 8.18). Respondents in West Bengal did not go for any other work except fish marketing. Since the post harvest fishing activities alone are no longer sufficient to support the households, other livelihood options were explored.

(iii) Pattern of expenditure

The major household expenses measured include expenditure on food, clothing, fuel, medical, education, entertainment, personals and durables. The pattern of expenditure of respondent household engaged in marketing and processing of fish is given in Table 8.24.

On an average, 31.41 per cent of the expenditure is still for food in the sample households indicating that the standard of living is still low as a major share of expenditure goes into meeting basic household necessities (Fig. 8.19). 20.39 per cent of expenditure is on durables which is much sought after and 16.31 per cent of expenditure is on clothing. Medical expenses account for 7.23 per cent, entertainment 6.31 per cent and education 6.03 per cent. The personal expenses of respondents accounts for 8.59 per cent.

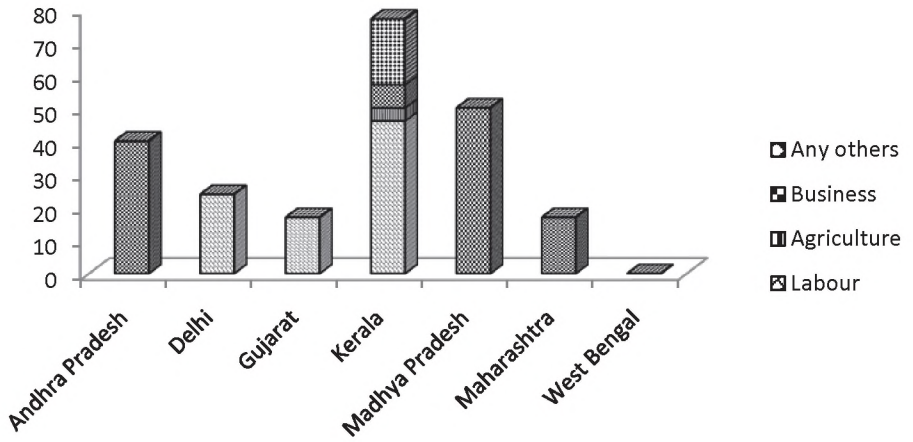


Fig. 8.18: Non-fisheries activity across states

The average amount spent by respondents in most states for food was with the range being 60.30 per cent in West Bengal to 28.75 per cent in Andhra Pradesh (Fig. 8.20). The maximum amount spent for education is in Delhi (10.18 per cent) followed by Kerala (9.44 per cent). Respondents in Gujarat (39.06 per cent) spend maximum on clothing and Delhi (8.01 per cent) and Madhya Pradesh (6.70 per cent) on fuel.

The total expenditure varied from Rs. 849.20 in Madhya Pradesh to Rs. 14424.95 in Maharashtra.

Table 8.24: Pattern of expenditure of the fisher family (monthly) (Post- harvest)

States	Items								
	Food	Cloth-ing	Fuel	Medical	Educa-tion	Enter-tain-ment	Per-sonal	Dura-bles	Total
Andhra Pradesh	3004.80 (33.48)	852.88 (9.50)	601.73 (6.70)	601.92 (6.71)	400.00 (4.46)	1603.84 (17.87)	1842.30 (20.53)	67.30 (0.75)	8974.77
Delhi	793 (9.87)	39.05 (0.49)	43.06 (0.54)	46.71 (0.58)	119.00 (1.48)	44.88 (0.56)	283.78 (3.53)	6666.67 (82.96)	8036.13
Gujarat	2724.99 (49.22)	378.72 (6.84)	443.66 (8.01)	796.00 (14.38)	563.71 (10.18)	279.84 (5.05)	349.23 (6.31)	0.00 (0.00)	5536.15
Kerala	1399.85 (28.75)	236.76 (4.86)	160.93 (3.31)	204.14 (4.19)	195.14 (4.01)	182.18 (3.74)	393.58 (8.08)	2095.82 (43.05)	4868.40
Madhya Pradesh	444.00 (52.28)	44.90 (5.29)	50.40 (5.93)	44.50 (5.24)	38.60 (4.55)	106.80 (12.58)	110.60 (13.02)	9.40 (1.11)	849.20
Maharashtra	4492.80 (31.15)	5634.08 (39.06)	273.92 (1.90)	1414.00 (9.80)	1186.40 (8.22)	520.40 (3.61)	621.60 (4.31)	281.75 (1.95)	14424.95
West Bengal	1189.00 (58.42)	108.65 (5.34)	93.59 (4.60)	124.64 (6.12)	192.18 (9.44)	85.82 (4.22)	241.37 (11.86)	0.00 (0.00)	2035.25
Total	14048.44 (31.41)	7295.04 (16.31)	1667.29 (3.73)	3231.91 (7.23)	2695.03 (6.03)	2823.76 (6.31)	3842.46 (8.59)	9120.94 (20.39)	44724.87

Figures in parenthesis indicate percentage to total

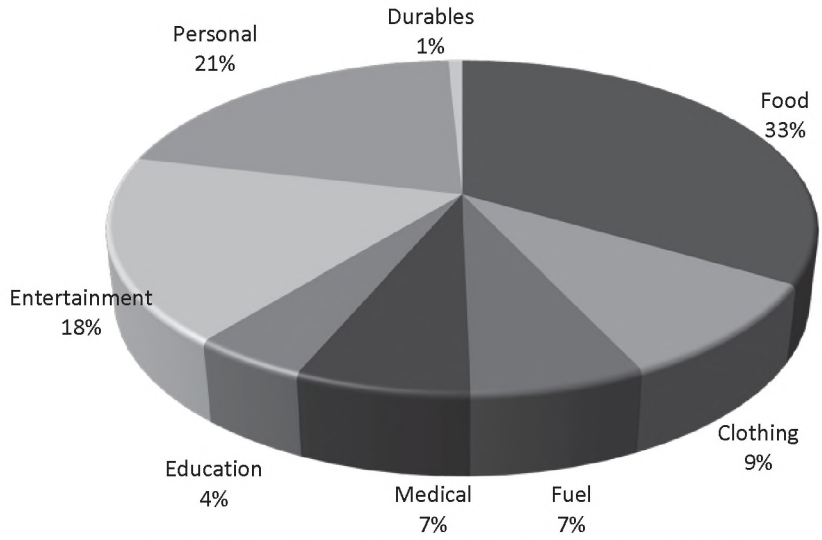


Fig. 8.19: Expenditure pattern of respondent households

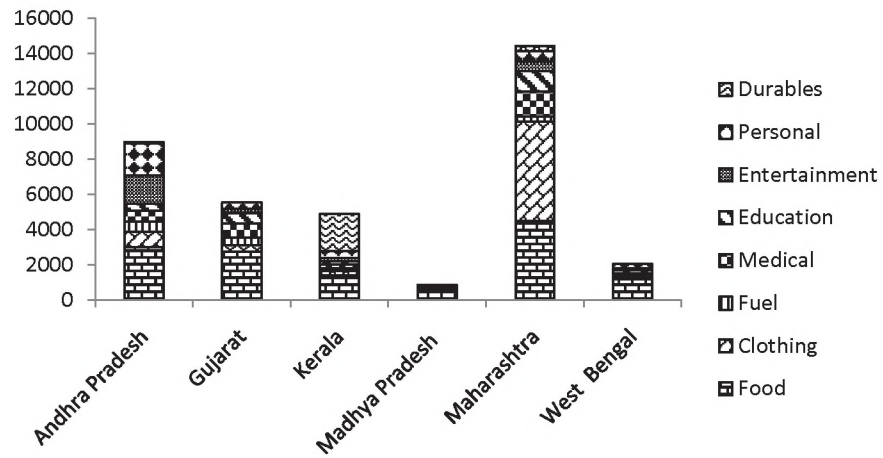


Fig. 8.20: Expenditure pattern across states

(iv) Savings

The savings of the respondent households are indicated in Table 8.25.

It can be observed from the table that 41.45 per cent of the respondents did not have any savings. Most of the respondents had savings of less than Rs. 50000 (47.69 per cent). About 4.23 per cent of respondents had savings ranging from Rs. 50000 to Rs. 100000 and 0.20 per cent had a saving of more than Rs. 100000. 6.44 per cent of the respondents had some savings, the amount was not mentioned.

39.84 per cent of respondents in Andhra Pradesh, 20.32 per cent in Kerala, 20.12 per cent in Maharashtra, 10.06 per cent in Madhya Pradesh, 8.05 per cent in Gujarat and 1.61 per

cent in Delhi had savings (Fig 8.21). In most states the amount was less than Rs. 50000.

Savings pattern of respondents in Delhi was low due to high expenditure.

Table 8.25: Savings details of respondent households (Post- harvest)

States	Frequency of respondents having Savings					Total
	Nil	< 50 k	50-100.00k	>100.00K	Have savings but amount not mentioned	
Andhra Pradesh	99	79	20	0	0	198
Delhi	0	8	0	0	0	8
Gujarat	7	0	1	0	32	40
Kerala	67	33	0	1	0	101
Madhya Pradesh	5	45	0	0	0	50
Maharashtra	28	72	0	0	0	100
West Bengal	0	0	0	0	0	0
Total	206	237	21	1	32	497

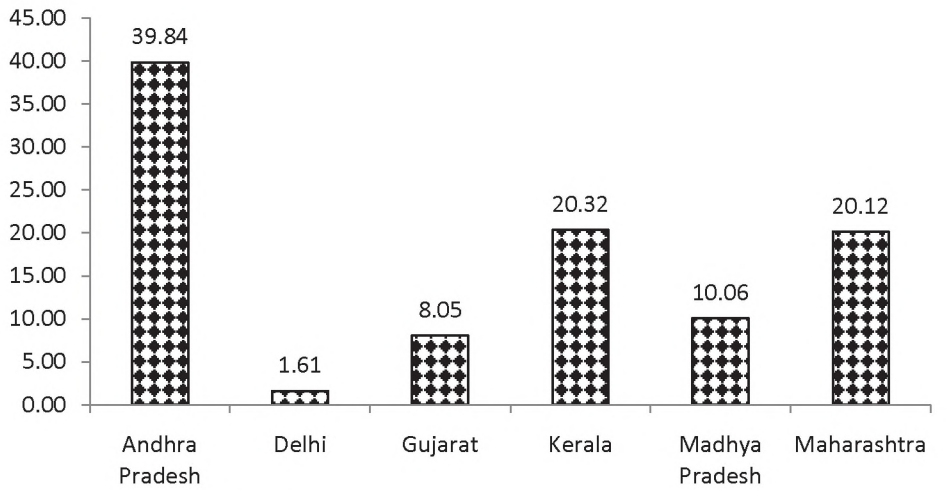


Fig 8.21: Extent of savings in respondent households

(v) Indebtedness of the respondents households

About 41.45 per cent of the households engaged in allied post harvest fisheries activities were not having savings (Table 8.25). It can be seen from table 8.26, that 299 respondent households of the total 648 households had debts (Fig 8.22.). Of the total indebted families, 31.77 per cent were in Andhra Pradesh, 25.42 per cent in Kerala, 15.05 per cent in Madhya Pradesh and 12.37 per cent in Maharashtra. The average amount ranged from Rs. 1, 76,729 in Kerala to Rs. 17,600 in Andhra Pradesh (Fig 8.23). The maximum amount repaid was also in Kerala with Rs. 38308. Except Kerala and Maharashtra, repayment was nil in other states. On the whole the average debt was Rs. 4, 93,425 and the repayment was Rs. 52209.00.

Table 8.26. Indebtedness of the sample respondents (Post- harvest)

States	Access to Health care (km)		
	Number of persons	Average Amount per person	Average Amount repaid
Andhra Pradesh	95 (31.77)	17600 (3.57)	0 (0.00)
Delhi	20 (6.69)	113833 (23.08)	0 (0.00)
Gujarat	24 (8.03)	41538 (8.42)	0 (0.00)
Kerala	76 (25.42)	176729 (35.83)	38308 (73.37)
Madhya Pradesh	45 (15.05)	580 (0.12)	0 (0.00)
Maharashtra	37 (12.37)	61962 (12.56)	13901 (26.63)
West Bengal	2 (0.67)	81000 (16.42)	0 (0.00)
Total	299	493242	52209

Figures in parenthesis indicate percentage to total

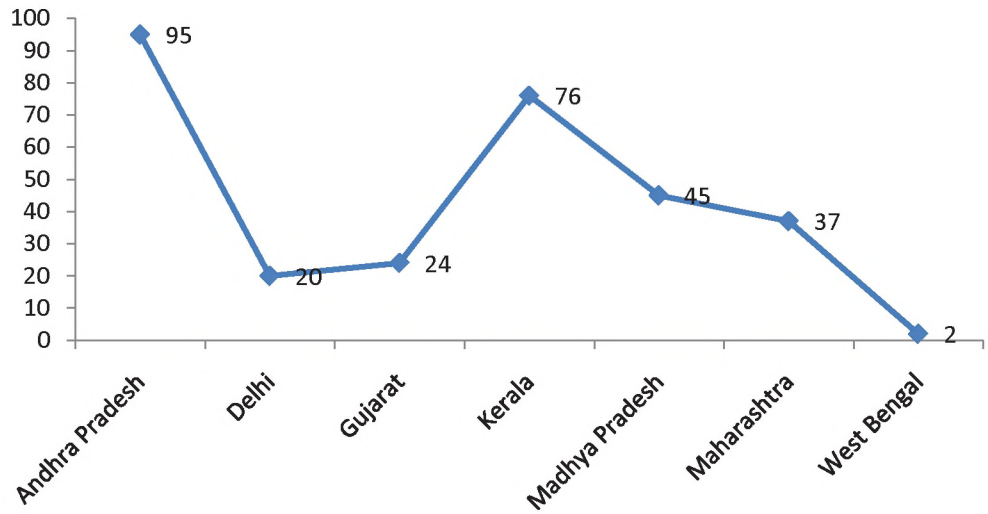


Fig. 8.22: Status of indebtedness

(vi) Sources of lending

While it is clear that most respondents in the post harvest fisheries sector had availed loans, the sources of this credit were also looked into. The lending organizations are given in (Table 8.27).

A total of 346 respondents had availed loans for various purposes. Jewel loans were the most popular source to depend upon for 118 respondents of Andhra Pradesh (34.10 per cent). Friends and relatives and institutional lenders like banks were the next to depend upon with 17.43 per cent each. This is followed by loans from co-operatives (14.45 per cent). Interestingly private money lenders were not seem to be so popular among the respondents in this sector.

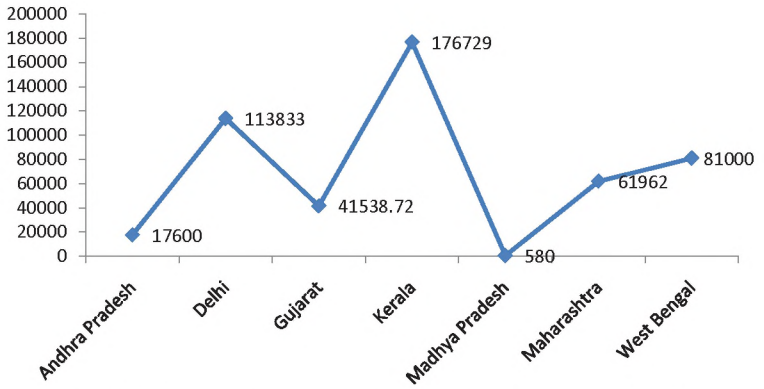


Fig. 8.23: Average debt among respondents across states (Rs)

In Andhra Pradesh as mentioned jewel loans dominated, followed by friends and relatives (12.50 per cent). In Delhi majority availed loans from banks (40.00 per cent). In Kerala major source of loans was co-operatives followed by private money lenders and others (30.00 per cent each). In Gujarat, friends and relatives was the major source (68.75 per cent) followed by other (27.08 per cent). In Kerala loans from co-operatives (53.95 per cent) was dominant followed by private money lenders (23.68 per cent) and banks (22.37 per cent). In Madhya Pradesh, Maharashtra and West Bengal banks were the major sources of loan with 88.86, 48.78, 50.00 per cent of beneficiaries respectively.

Table 8.27 Sources of lending (Number of respondents who had availed(post-harvest)

Sl. No:	Sources	AP	Delhi	GU	RMP	Mah	WB	Total	Per cent to total
1.	Banks	9	4	1	8	20	1	60	17.34
2.	Co-operative	9	0	0	0	0	0	50	14.45
3.	Private money lenders	4	3	1	0	0	0	26	7.51
4.	Friends / Relatives	20	0	33	1	6	0	60	17.34
5.	Jewel loans	118	0	0	0	0	0	118	34.10
6.	Others	0	3	13	0	15	1	32	9.25
7.	Total	160	10	48	9	41	2	346	100.00

(vii) Purpose of availing loans

The details on the purpose of availing loans and number of loans availed by the respondent households are indicated in Table 8.28.

The major purposes of loans availed was for fishery related activity (34.41 per cent) followed by health and social security reasons (28.18) and house construction or purchase of land (15.24). (Fig 8.24).

State-wise comparison of purpose of availing loan indicates that in Andhra Pradesh fishery activity was the main reason, while in Delhi expenditure on education was the important factor (Fig 8.25). In Gujarat, Madhya Pradesh and Maharashtra other issues were dominant, while in Kerala it was for house construction.

Table 8.28: Purpose of availing loans
(Number of respondents who had availed*) (Post- harvest)

Sl. No:	Purpose	AP	Delhi	Guj	Ker	MP	Mah	WB	Total	Per cent to total
1.	Fishery activity related	128	0	2	10	0	9	0	149	34.41
2.	House construction / Land purchase	8	2	0	48	2	7	1	66	15.24
3.	Marriage expense	32	1	0	11	0	0	0	43	9.93
4.	Education	16	3	0	3	0	0	0	19	4.39
5.	Health and Social Security	96	0	7	5	1	13	0	122	28.18
6.	Any others	0	0	16	0	6	11	1	34	7.85
7.	Total	280	6	25	77	9	40	2	433	100.00

Figures in parenthesis indicate percentage to total

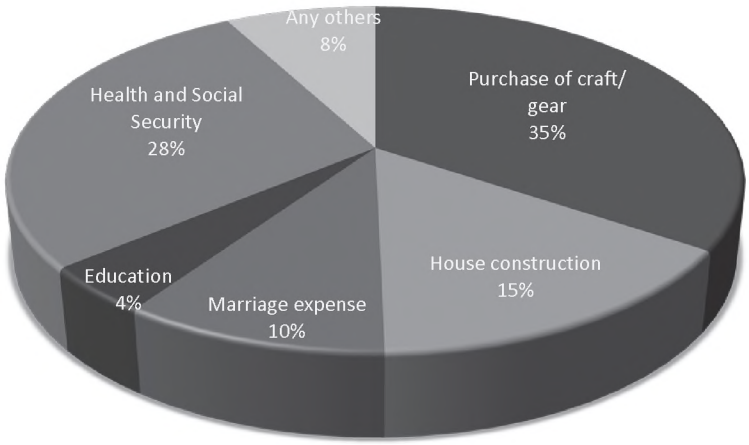


Fig 8.24: Purpose of availing loans

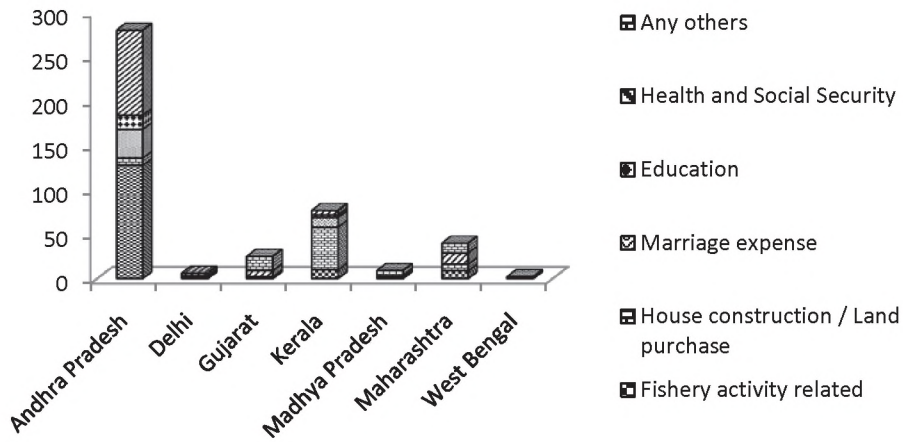


Fig 8.25: Purpose of availing loans across states

(viii) Suggestions to enhance the income and employment generation

The percentage response of the respondents' suggestions for enhancing the income and employment generation by fishermen is indicated in table 8.29.

Regulation of fish marketing through institutional interventions was the major suggestion given by 50 per cent of the respondents owing to the fact that the income of persons involved in allied post harvest fishery activities is greatly affected by intermediaries

Need for arranging institutional financial support like micro credit for fisheries SHGs etc. was suggested by 47.06 per cent of respondents.

Table 8.29: Suggestions for enhancing the income and employment generation by fishermen (percentage response) (Post- harvest)

Sl. No	Suggestions	AP	Delhi	Guj	Ker	MP	Mah	WB	Total
1.	Arranging the institutional financial support like micro credit for fisheries, SHG, etc	0	0	0	28	5	0	15	48
2.	Regulation of fish marketing through institutional interventions	0	0	0	0	1	0	50	51
3.	Vocational training for fisherwomen to undertake house hold income activities during dry/ off season	0	0	0	0	0	0	0	0
4.	Regulation of PDS and supply of the basic food items and fuel (like kerosene, LPG etc) by the Govt. agencies	0	0	0	0	2	0	0	2
5.	Provisional of rural infrastructure for general societal / human development	0	0	0	0	1	0	0	1
6.	Total	0	0	0	28	9	0	65	102

Literacy, Income and Health of Fishers in India

09

09

Literacy, Income and Health of Fishers in India

Shyam.S.Salim, R.Sathiadhas, and R.Narayanakumar

Indian fisheries and aquaculture is an important sector of agriculture, providing employment, food and nutritional security particularly to the rural poor and better access to protein rich food for all. Globally, the capture fisheries and aquaculture produced 154 million tonnes of fish in 2011 with a per capita food fish supply of 18.8 kg. During the year, India contributed 5.33 per cent of the world total fish production (4.57 per cent of the total capture fish production and 6.63 per cent in aquaculture production). India ranked second after China in the world aquaculture production. Though India is one of the largest consumers of the fish in the world, per capita consumption of fish, at 4.78 kg/head/year, is one of the lowest in the world.

The fisheries sector has been one of the major contributors of foreign exchange earnings through export. The marine products exports from India continue to surge up new heights and unabated by global recession. During 2010 the growth assumed higher significance with the exports touching around 2.3 billion dollars by January 2011 and is expected to touch 2.5 billion dollars with an expected growth of 15 per cent in terms of quantity and value. Frozen shrimp accounted for 46.92 per cent of the earnings followed by frozen fish and cephalopods. European Union is the prime geographic destination followed by US, China and South East Asia, for Indian seafood.

The general awareness about fish as a healthy food and health concerns greatly influenced the consumption of fish in the country. The demand for fish and fishery products is increasing considerably both at domestic and export markets. The total demand for fish is projected at 9.74 million tonnes for 2012 and 11.85 million tonnes by 2017. The supply projections fall short of the demand so the production and productivity issues of both inland and marine fisheries and aquaculture are to be addressed. Concerns about the quality and hygiene and greater demand for improved and value added fish and fishery products are the other areas to be addressed. Thus the current plan should address the demand and supply of fish and fishery products along with quality concerns.

Literacy, income and health are interlinked for overall development of the personality of an individual and development of the society. Education gives respect and value to an individual in a society and grades in him high among the population especially in rural communities. Education is a basic right for all human beings and an essential prerequisite for infusing self-confidence, reducing poverty, improving living conditions and building a food-secure world.

Literacy and numeracy are integral to the livelihoods of many small-scale fishing communities. Despite the educational marginalization faced by many fishing communities, there appears to be rich cultures of literacy with often-high levels of motivation for functional literacy learning. Fishing communities often face educational disadvantage due to geographical and social marginalization (FAO, 2006).

Income of the household is an important indicator of the socio economic status in a community. The fisheries sector in India has undergone rapid changes over the last six decades to develop from a sustenance fishing to the status of a multi-crore fishing industry. However the economic and social benefits associated with this transformation have not trickled down to the grass root level of the Indian fishing community. The income distribution in the sector is highly skewed in favor of the mechanized sector, which controls over 70 per cent of the total fish landings, though they account for only 30 per cent of the stake holders. The per capita area available per fishermen is gradually declining over the years. The per capita earnings also vary among the fishermen working in the three different sectors of the fishery.

Assessment of health status of fishing communities is very important. There are many factors that influence people's health. These factors are often interactive and out of individual's control. An unhealthy condition in a family has psychological and economic impact not only on the concerned individual but also on the entire household. A global study by UNICEF has estimated that in urban households of some under developed countries, the family which lost one member due to AIDS, have their income reduced by 52-67 per cent, while their expenditure increased four folds. In India, the weak, marginal section of the society is vulnerable to all sorts of health hazards including TB, lung and skin infection, AIDS, cancer and related ailments. The small and marginal section of the fishing community, which lies in the bottom of the socio economic strata, is no exception to this.

The three parameters viz., literacy, health and income are the building blocks of the pyramid of socio economic development of the community. Hence the project to assess the literacy, income and health status of the fisher folk in India was initiated to develop a strong data base for the use of administrators, policy makers, researchers and academicians. The overall objective was to assess the status of literacy, health and income of marine and inland fishers, fish farmers and workers in allied activities both in capture and culture systems. The entire fishing arena was divided into marine and inland sectors and further classified into capture and culture sub sector. The distribution of samples for the entire study were as follows.

Table 9.1: Distribution of samples for the entire study

Sl. No:	Sector / Sub sector	Samples	States Represented
I.	Marine Sector		
A.	Marine Capture	1649	Kerala, Karnataka, Goa, Maharashtra, Gujarat, West Bengal, Orissa, Andhra Pradesh
B.	Mariculture	225	Kerala and Tamil Nadu
II.	Inland		
A.	Inland capture		Kerala, Karnataka, Gujarat, West Bengal, Orissa, Andhra Pradesh
1.	Lakes, Riverine, Reservoir	981	Kerala, Karnataka, , Gujarat, West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Assam, Kerala, Uttar Pradesh, Madhya Pradesh, Jharkhand, Bihar
2.	Cold water	50	Himachal Pradesh and Uttarakhand
B.	Inland culture		
1.	Freshwater Aquaculture	502	Assam Andhra Pradesh Punjab, West Bengal, Orissa , Tamil Nadu
2.	Brackish water Aquaculture	409	Andhra Pradesh , Odisha, Kerala and Tamilnadu
III.	Marketing and Processing	648	Kerala, Gujarat, Andhra Pradesh, Maharashtra, Delhi
	Total	4464	

The data was collected with the pre-tested schedule from the selected sample respondents giving due representation for different regions and fishery activities.

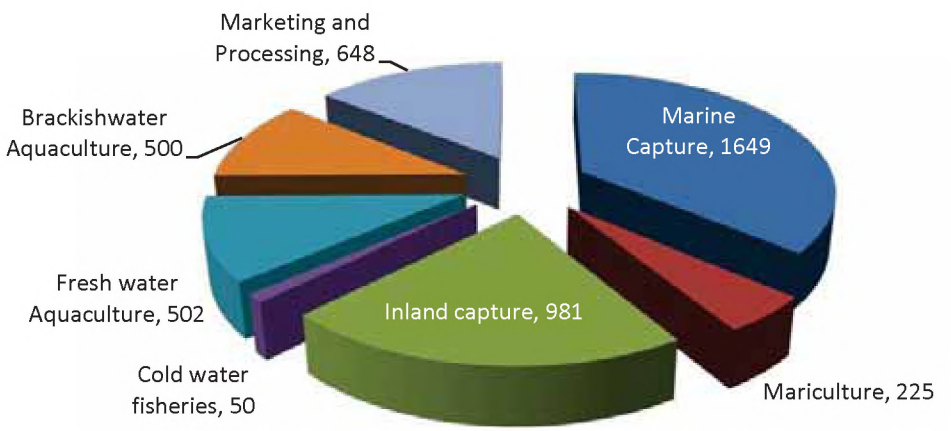


Fig. 9.1: Distribution of respondents across sector

The results on the assessment of the literacy, health and income of the respondent households across the different sectors and sub sectors were discussed in the preceding Chapters 2 - 8.

The summary and conclusion chapter attempts to compare the results across the different themes and discuss on their status. The comparison is discussed under the following heads

(A) General particulars
(B) Literacy status
(C) Health status
(D) Income status

A. General particulars

The general particulars of respondent's households included age, family size, family composition etc.

Table 9.2: Age distribution of the sample respondents (Years)

Sl. No.	State	<35	36-55	>56	Total
1.	Marine Capture	425	887	337	1649
2.	Mariculture	57	142	26	225
3.	Inland capture	353	456	172	981
4.	Cold water fisheries	13	28	9	50
5.	Freshwater Aquaculture	172	240	90	502
6.	Brackishwater Aquaculture	65	254	90	409
7.	Marketing and processing	213	355	80	648
8.	Total	1298	2362	804	4464

(i) Age distribution

The age distribution of respondent households are given in Table 9.2. The age distribution of the sample respondents across the different sectors indicated that 51.75 per cent of the respondents were of the age group of 36-55 and 30.76 per cent of the respondents were of the age group less than 35. The age group of more than 56 years was represented by 17.50 per cent of the sample respondents across the sector. It is heartening to note that the fisheries sector continues to attract the young and medium age group (Figure 9.2)

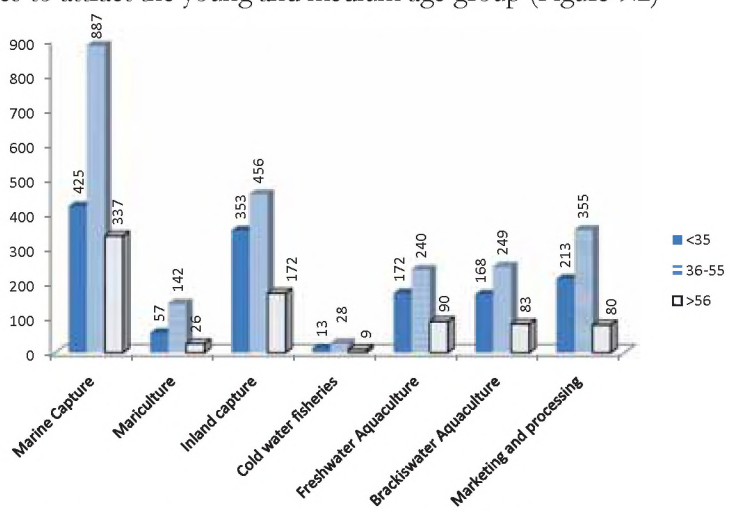


Fig. 9.2 Age distribution of respondent households across sectors

(ii) Family composition

The family composition of the respondents is indicated in Table 9.3

The family composition of the respondents in terms of male and female indicated that the male outnumber the females and the male - female ratios was estimated as 1.13.The male female ratios ranged from 1.04 in marketing and processing sector to 1.47 in the case of cold water fisheries. The results are in conformity with the national average of 1.15.

Table 9.3: Family composition of the respondent households –Male and Female (Number)

Sl. No.	Sector	House-holds	Male	Female	Total	Male Female Ratio
1.	Marine Capture	1649	3954	3570	7554	1.11
2.	Mariculture	225	441	393	834	1.12
3.	Inland capture	981	243	215	458	1.13
4.	Cold water fisheries	50	122	83	205	1.47
5.	Freshwater Aquaculture	502	1000	805	1805	1.24
6.	Brackish water Aquaculture	500	895	758	1653	1.18
7.	Marketing and processing	648	1265	1214	2479	1.04
8.	Total	4555	7920	7038	14988	1.13

(iii) Family size

Family sizes of the respondent households are given in Table 9.4 the small family norm is mostly adopted by the fisher households of India. The average size of family in India worked out to be 4.34 ranging from 3.70 in mariculture to 4.78 in fresh water aquaculture. It is interesting to note that 46.76 per cent of fisher households have a family size of 2-4 members and 38.99 per cent of the households in India is housing 5-6 members and hardly 4.61 per cent of households are having more than 7 members in the family. There exists no difference in the family size across the different sectors which indicate the popularization of the small family norms across the states (Figure 9.3).

Table 9.4:Family size of the respondent households (Number)

Sl. No.	Sectors	Family Size					Total	Average family size
		<2	2-4	5-6	7-10	>10		
1.	Marine Capture	0	840	629	180	30	1649	4.56
2.	Mariculture	1	184	40	0	0	225	3.70
3.	Inland capture	3	468	386	115	9	981	4.68
4.	Cold water fisheries	4	4	21	22	3	50	4.10
5.	Fresh water Aquaculture	6	299	147	48	8	502	4.78
6.	Brackish water Aquaculture	3	312	135	43	7	500	4.51
7.	Marketing and processing	0	27	418	190	13	648	4.03
8.	Total	17	2130	1776	598	70	4555	4.34

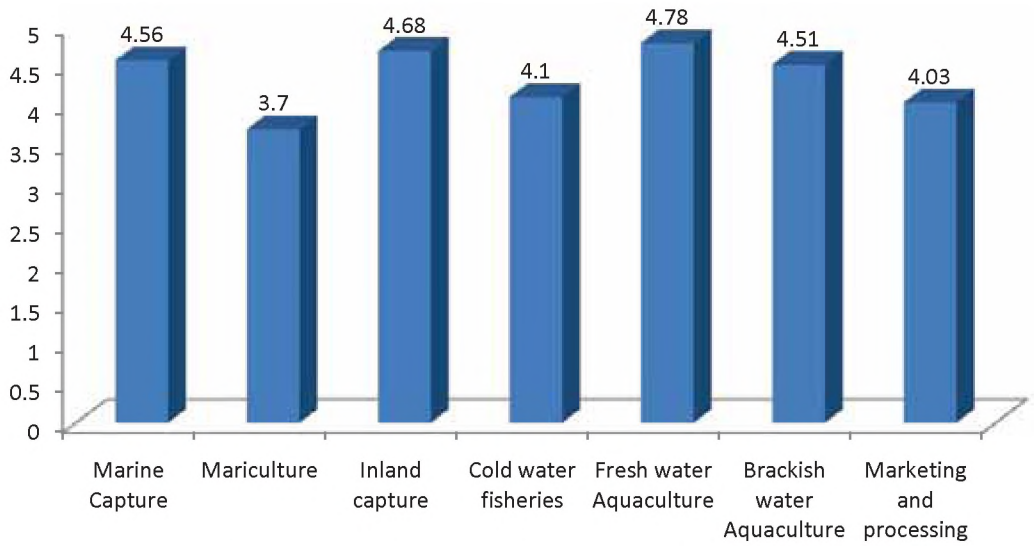


Fig 9.3: Average family size of the respondent households

(iv) Age composition

The classification of fisher population as adults (above 15 years) and children (less than 15 years) is given in Table 9.5.

The male - female ratio of the adult group (>15 years) was found to be 1.10:1.00 whereas the same for the children (<15 years) was found to be 1.14:1.00. Adult males in the age group of above 15 year outnumber the females in all the sectors and it was also noticed among the the children (<15years) The adult to child ratio was found to be 2.45 for the total sample and it ranged from 1.51 in inland capture sector to 3.73 in brackish water aquaculture(Figure 9.4).

Table 9.5: Age composition of the respondent households (Number)

Sectors	Adult (> 15 years)		Children < 15 years)		Total		Depend-ency Ratio
	Male	Female	Male	Female	Male	Female	
Marine Capture	2717	2567	1194	984	3911	3551	2.43
Mariculture	339	310	102	83	441	393	3.51
Inland capture	1479	1282	953	877	2432	2159	1.51
Cold water fisheries	84	55	38	28	122	83	2.11
Fresh water Aquaculture	843	792	240	210	1083	1002	3.63
Brackish water Aquaculture	772	592	188	178	960	770	3.73
Marketing and processing	904	867	244	232	1148	1099	3.72
Total	7138	6465	2959	2592	10097	9057	2.45

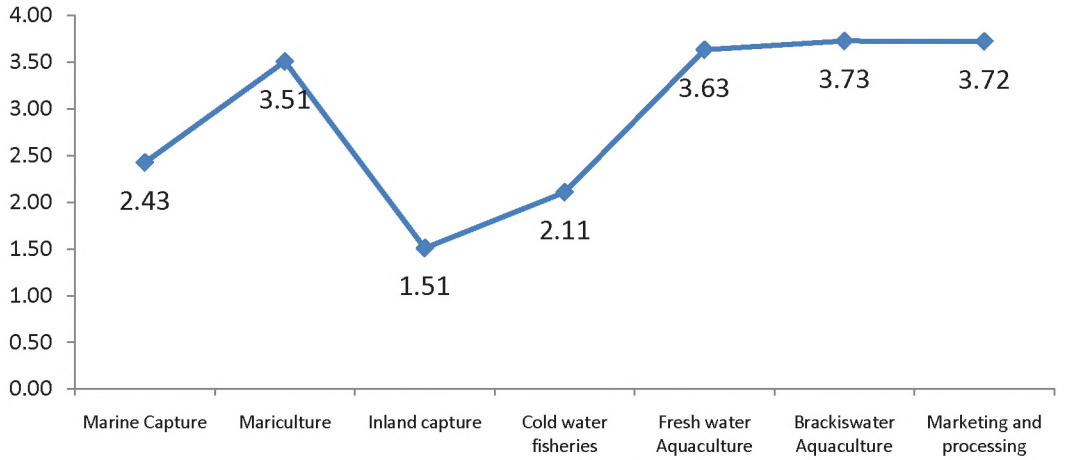


Fig 9.4 Dependency ratio of respondent households across sectors

B. Literacy status

The literacy status of the respondent households was analyzed through the literacy level, educational status – continuing and dropouts and access to educational facilities. The illiterate indicates fisherfolk without any formal education and who don't even possess functional literacy.

(i) Literacy status

The literacy status includes the level of education as indicated by primary, secondary and collegiate. The primary level indicates schooling till fourth grade, secondary level is indicated by high school, secondary and vocational education. The collegiate level of education was denoted by collegiate and professional education.

The general literacy rate of India as a whole was 73.52 per cent (Census-2001) against the literacy rate of 64.64 per cent among the fisherfolk. The results indicate that among the literates 32.85 per cent have primary level of education, 53.88 per cent have secondary level of education and 13.10 per cent have collegiate level of education. The overall literacy rate for the total samples was found to be 79.37 per cent much higher than the sector literacy rate across the country.

The literacy rate ranged from 70.99 per cent in inland capture sector to 95.44 per cent in mariculture. The results indicated that the literacy does not seem to be skewed towards any particular sector among the fisher population. Also the literacy indicates higher level when compared to the state and sector average.

Table 9.6: Literacy status of respondent households (Number)

Sl. No.	Sector	Total	Illiterate	Literate	Primary Level	Sec-ondary Level	Colle-giate Level	Lit-eracy rate
1.	Marine Capture	7486	1504	5765	1761	3268	736	77.01
2.	Mariculture	834	11	796	280	468	48	95.44
3.	Inland capture	4226	1226	3000	1265	1518	217	70.99
4.	Cold water fisheries	215	52	163	81	55	21	75.81
5.	Freshwater Aquaculture	2139	201	1689	460	821	408	78.96
6.	Brackish water Aquaculture	1730	352	1322	412	652	258	76.41
7.	Marketing and processing	2391	462	1930	558	1120	247	80.96
8.	Total	19021	3808	14665	4817	7902	1935	79.37

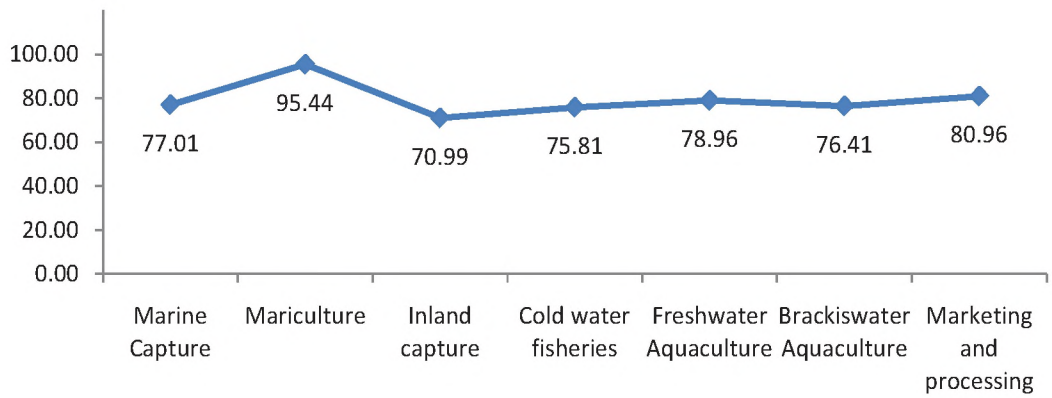


Fig 9.5: Literacy rates of respondents across sector

(v) Educational profile

The information on education of the respondents in terms of continuing and discontinuance of education would provide the scope for employment opportunities, possible migration, and alternative avocation of the sample households. Thus continuing and dropout ratios were calculated among the respondent households across the different sectors.

The dropouts were more at secondary level of education with 50.90 per cent while the dropout at primary level of education was about 41.08 and that of collegiate level was 8.02 per cent . The continuing and dropout ratios was 0.62 for the entire sector ranging form 0.44 in brackish water sector to 0.99 in the case of marketing and processing sector. Alternative source of livelihood, possibility of seeking employment in fisheries enterprises, scope of labour can be the reasons for the increasing dropouts among the urban States (Figure 9.6).

Table 9.7: Educational status of respondent households - Continuing and Dropout Number)

Sl. No.	Sector	Con-tinuing	Drop outs				CD Ratio
			Primary	Sec-ondary	Colle-giate	Total	
1.	Marine Capture	1721	942	1698	292	2932	0.59
2.	Mariculture	208	175	226	15	416	0.50
3.	Inland capture	1142	733	896	174	1803	0.63
4.	Cold water fisheries	56	57	29	7	93	0.60
5.	Fresh water Aquaculture	805	873	394	70	1337	0.60
6.	Brackish water Aquaculture	761	812	813	105	1730	0.44
7.	Marketing and processing	769	142	570	66	778	0.99
8.	Total	5462	3734	4626	729	9089	0.62

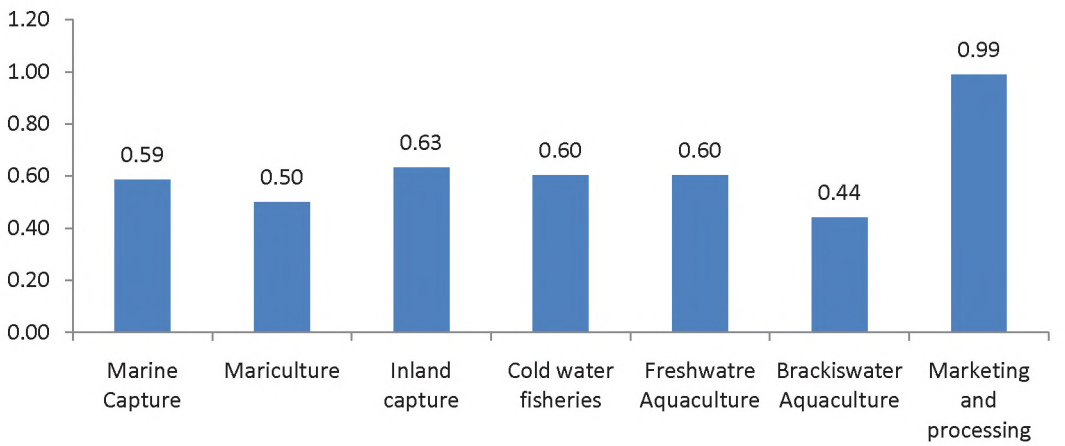


Fig 9.6: Continuing Dropouts ratio among respondent households

(iii) Access to educational institutions

Access to education is an important yardstick to measure the socio-economic well being of a society. The proximity of the educational institutions like primary school, high school, college and professional college provides a major impetus when it comes to continuing education. This was something the fisherfolk were said to be denied earlier which was disproved by this analysis.

The access to education was analyzed by finding the distance to nearby educational institutions. The average distance from fishing villages to nearby primary, high school, college and professional institution is given in table 9.8. As a whole the average distance to a primary school is 1.46 km, high school 3.40 km, college 13.33 km and professional institution 19.48 km from fishing villages in India. The average distance to primary school ranges from 0.90

km in freshwater aquaculture to 3.23 km for brackish water aquaculture. The average distance to high school ranges from 1.90 km in freshwater aquaculture to 6.67 km for brackish water aquaculture. The average distance to colleges ranges from 8 km in marine capture to 24.24 km for mariculture sector. The average distance to professional colleges ranges from 11.90 km in marketing and processing sector to 29.04 km for mariculture. The results very clearly indicate the reasons for growing literacy among the fisherfolk. Thus the analysis clearly indicate that the improved or increased access to educational facilities has helped to increase the literacy level of the fisherfolk.

Table 9.8: Access to education (km)

Sl. No.	Sector	Distance to nearby educational institution (in km)			
		Primary School	High School	College	Professional College
1	Marine Capture	1.05	2.59	8	12.44
2	Mariculture	0.92	2.16	24.24	29.04
3	Inland capture	1.32	4.23	11.73	19.83
4	Cold water fisheries	1.38	3.22	21.04	27.79
5	Fresh water Aquaculture	0.9	1.9	11.3	21.2
6	Brackish water Aquaculture	3.23	6.67	8.26	16.23
7	Marketing and processing	1.41	3	8.73	11.9
8	Total	1.46	3.40	13.33	19.78

C. Health status

The average life expectancy of people in the country is worked out at 65.5 years ranging from 62.8 years for male to 68.2 years for female.

The health status of the respondent households was studied based on the parameters like administration of vaccines, incidence of discontinuation, birth weight of infants, incidence of maternal and child mortality at the time of birth, incidence of common diseases and special ailments among adults and children. Disease management aspects like access to health care, problems in health management and suggestions to improve the health care facilities are also dealt in this session.

(i) Vaccination regime of infants / children (less than 15 years)

The average age of administration of vaccination and incidence of discontinuation among infants/ children with age less than 15 years in the different fishing sectors of India is furnished in table 9.9. The vaccination for Pox, BCG, MMR and Polio were regularly taken by all the families covered under the study. The average age at which the vaccination for pox was given to the child worked out to 1.79 years ranging from 1.00 year in freshwater aquaculture sector to 6.20 years in the case of cold water fisheries sector .The average age at which the vaccination for BCG was given to the child worked out to 1.08 years ranging from 0.69 years in cold water fisheries and inland capture sector to 2.62 years in the case of marine capture fisheries sector. The average age at which the vaccination for MMR was given to the child worked out to 1.21 years ranging from 0.96 years in inland capture fisheries sector to1.90 years in the case of cold water fisheries sector. The average age till which the vaccination for polio

was given to the child worked out to 4.67 years ranging from 3.58 years in inland capture sector to 5.70 years in the case of cold water fisheries sector.

Table 9.9: Vaccination regime of infants / children (less than 15 years) – Average age of administration and incidence of discontinuation

Sector	Average age of administration and incidence of discontinuation (percentage)									
	Pox		BCG		MMR		Polio		Others	
	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)
Marine Capture	1.05	Nil	2.62	Nil	1.20	Nil	4.50	Nil	0.10	1.05
Mariculture	1.13	Nil	0.75	Nil	1.20	Nil	4.44	Nil	Nil	Nil
Inland capture	1.05	6.81	0.69	1.14	0.96	1.47	3.58	0.63	Nil	Nil
Cold water fisheries	6.20	17.30	0.69	56.25	1.90	59.15	5.70	40.15	6.20	55.63
Freshwater Aquaculture	1.00	Nil	0.67	Nil	0.98	Nil	5.00	Nil	Nil	Nil
Brackish water Aquaculture	1.02	Nil	0.89	Nil	1.12	Nil	5.00	Nil	Nil	Nil
Marketing and processing	1.05	Nil	1.24	Nil	1.09	Nil	4.50	Nil	0.10	1.05
Total	1.79		1.08		1.21		4.67		2.13	

Normally polio administration continues till the age of 5 years

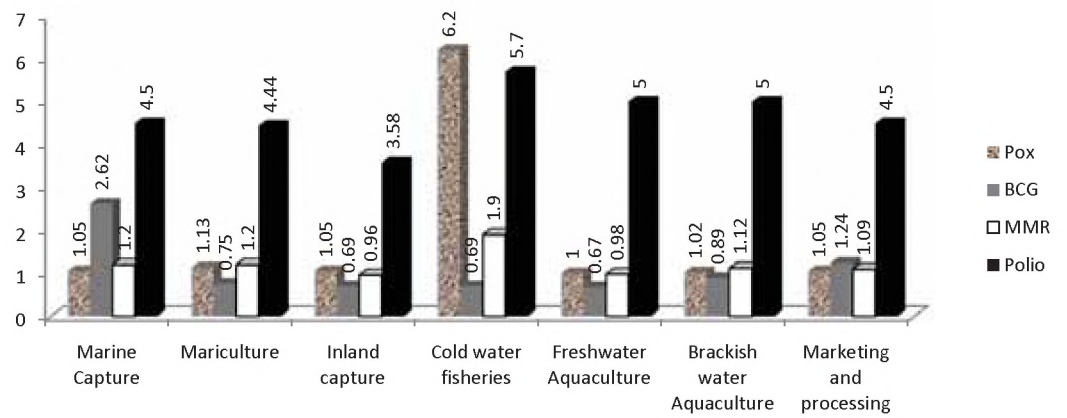


Fig 9.7: Average age of administration of vaccines

The reason for the discontinuation of vaccination regime of infants is given in Table 9.10. The traditional beliefs and lack of awareness about the availability of vaccines, lack of time to access the vaccination, lack of sufficient doses of vaccine at the locality and poor reliability on vaccines provided by government agencies were listed as the reasons for discontinuation of vaccination in the questionnaire. However in Indian fisheries sector sporadic cases of discontinuation of vaccination among the infants of fisherfolk were reported in the inland capture and cold water fisheries sector.

Table 9.10: Vaccination regime of infants / children - Reason for the discontinuation (Frequency)

Sl. No.	Reasons	Marine Capture	Mariculture	Inland capture	Cold water fisheries	Fresh water Aquaculture	Brackish water Aqua-culture	Marketing and pro-cessing
1	Traditional beliefs	1		22	7	Nil	Nil	Nil
2	Lack of awareness about the availability of vaccines	0	Nil	25	6	Nil	Nil	Nil
3	No time to access the vaccination	0	Nil	16	5	Nil	Nil	Nil
4	Lack of sufficient doses of vaccine at the locality	3	Nil	11	20	Nil	Nil	Nil
5	Poor reliability on vaccines provided by government agencies	1	Nil	8	Nil	Nil	Nil	Nil

(ii) Birth weight of infants

The birth weight of infants in fisher households for the sector is given in Table 9.11. The average birth weight of males was 2.72 kg and female was 2.67 kg. The average weight of male infants ranges from 2.60 kg in inland fisheries sector to 2.90 kg in the case of freshwater aquaculture. The average weight of female infants ranges from 2.57 kg in inland fisheries sector to 2.80 kg in the case of freshwater aquaculture (Figure 9.8)

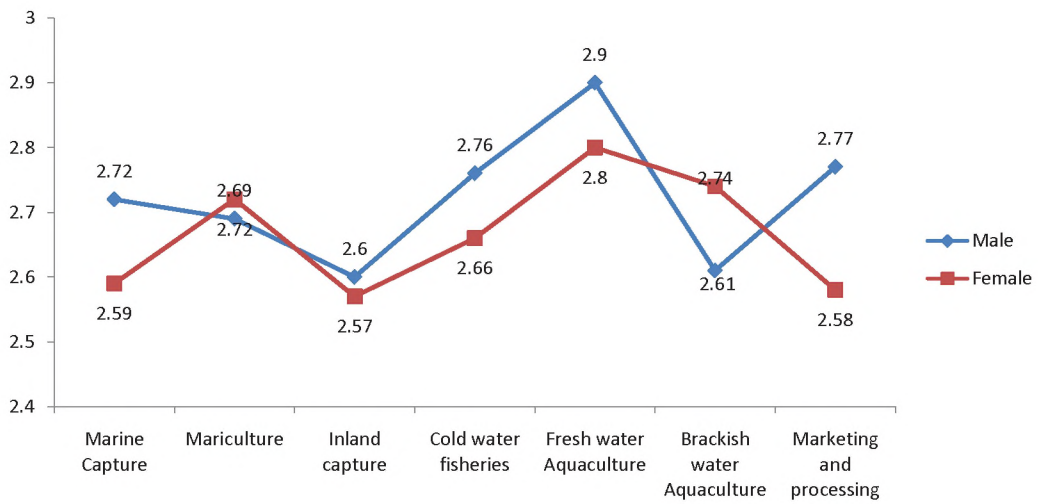


Fig 9.8: Birth weight of infants

Table 9.11: Birth weight of infants (kg)

Sl. No.	Sector	Weight (kg)		
		Male	Female	Total
1.	Marine Capture	2.72	2.59	2.65
2.	Mariculture	2.69	2.72	2.71
3.	Inland capture	2.60	2.57	2.59
4.	Cold water fisheries	2.76	2.66	2.71
5.	Fresh water Aquaculture	2.90	2.8	2.85
6.	Brackish water Aquaculture	2.61	2.74	2.68
7.	Marketing and processing	2.77	2.58	2.68
8.	Total	2.72	2.67	2.69

(iii) Incidence of mortality among mother/child during birth

Maternal and child mortality at the time of birth and infant mortality has been pressing concerns over the past. It was found that there exists no incidence of maternal mortality

Table 9.12: Incidence of mortality among mother/ child during birth (Number)

Sl. No.	Sector	No. of delivery	Mortality of mother/ child during birth				
			Mother	Maternal mortality rate	Child	Child mortality rate	Total
1.	Marine Capture	410	3	5.94	15	2.57	18
2.	Mariculture	8	0	0.00	0	0.00	0
3.	Inland capture	860	6	0.70	37	4.30	43
4.	Cold water fisheries	51		0.00	2	3.92	2
5.	Fresh water Aquaculture	312		0.00		0.00	0
6.	Brackish water Aquaculture	382	2	0.52	9	2.36	11
7.	Marketing and processing	342		0.00		0.00	0
8.	Total	2365	11	0.20	63	1.88	74

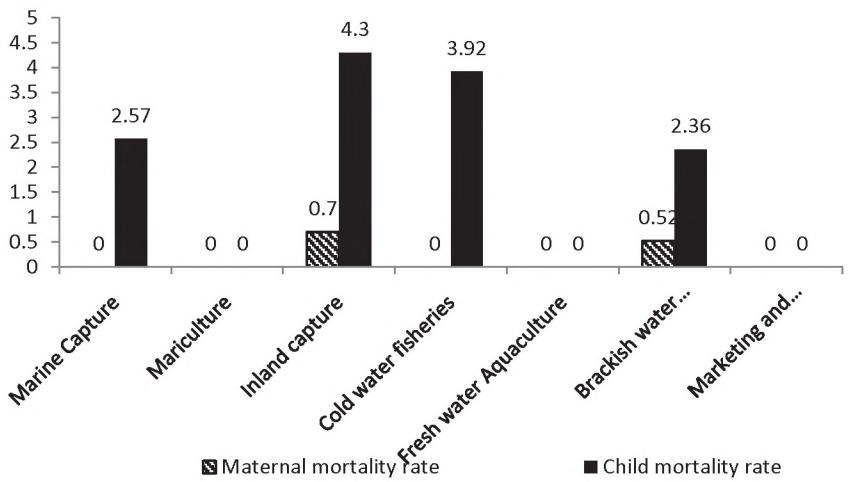


Fig 9.9: Maternal and Infant Mortality rates across sectors

across all selected respondent fisherfolk across the different sectors and is found to be 0.20 per cent for maternal mortality rate and 1.88 per cent for infant mortality rate . The maternal mortality rate was 5.94 for marine capture sector and 2.57 per cent in marine capture fisheries. (Table 9.12).Generally in India; adequate care is being taken now to reduce the incidence of maternal and infant mortalities.

(iv) Incidence of diseases among adults and children

The incidence, frequency, and previous occurrence of diseases among the adult family members and children across the different sector revealed that the major diseases found among the respondents were categorized under two groups, viz; common diseases and special ailments. Fever/flu, body ache, diarrhoea, gastroenteric disease, skin disorder, reproductive disorders were the common diseases studied on. Special ailments include diseases like cardiac failure, tuberculosis, anaemia, diabetics, blood pressure, AIDS and others were also considered.

The most common diseases found among the respondent families were fever and body ache. On an average most recent occurrence of fever/flu found among male members of the respondent families was 2.17 months and it was 2.98 months among female members .In the case of body ache the previous occurrence was found in 2.23 months in males and 0.89 months ago in females. Occurrence of diarrhoea and skin disorder was seen among male members only in the last quarter of the year.

Major diseases found among the children in the study area were fever/flu, body ache, diarrhoea, gastroenteric disease, skin disorder etc of which fever was the most popular disease found among the children. The average frequency of fever among male children was 2.15 times per year and a total of 71 male children were affected by fever across the different sectors last year. In the case of female children a total number of 48 were affected by fever with an average annual frequency of 2.19 times per year.

Incidence of diarrhoea was also high among the children with a total frequency of 1.90 times per year among the male children and 1.65 times per year among female children. Body ache and skin disorder were also found among children of respondent families .Occurrence of special ailments among the children was found to be very low compared with that of common diseases. Only anaemia was reported among the children of respondent families across the sector.

(v) Access to health care

The access to health care is also an important parameter, which determines the continued health of the fisherfolk. Often the distance leads to the non treatment or its delay. The access to health care was measured using the distance required to avail the same. (Table9.13). The results indicate that there exists considerable access to the primary health centre and hospital. The access to primary health centre ranged from 1.67 km in the mariculture sector to 8.31 km in the case of cold water fisheries. The access to hospitals ranged from 4.32 km in the mariculture sector to 21.3 km in the case of brackish water fisheries. (Figure 9.10)

Table 9.13: Access to health care (km)

Sl. No.	Sector	Access to Health care (km)	
		Primary Health Centre	Hospital
1.	Marine Capture	2.31	7.51
2.	Mariculture	1.67	4.32
3.	Inland capture	2.31	11.1
4.	Cold water fisheries	8.31	15.24
5.	Fresh water Aquaculture	2.3	6.8
6.	Brackish water Aquaculture	2.9	21.3
7.	Marketing and processing	2.68	6.63
8.	Total	3.21	10.41

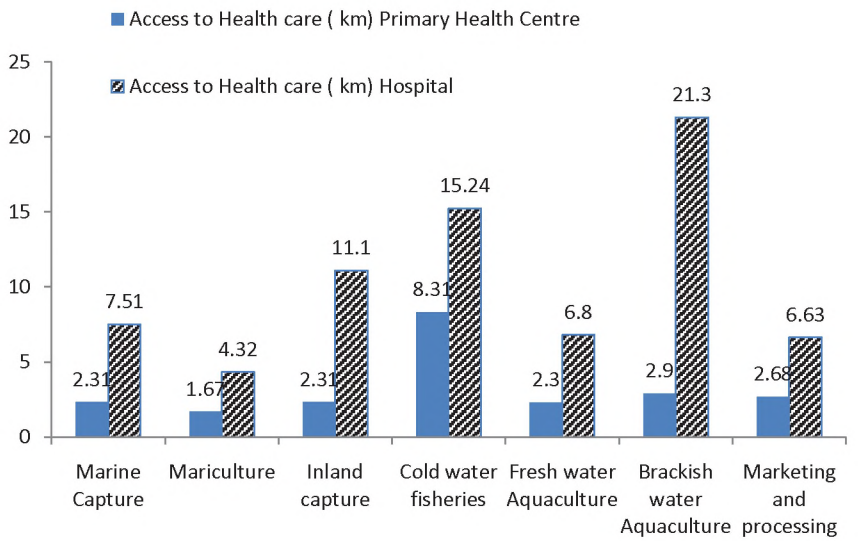


Fig 9.10: Access to health care facilities(km)

(xv) Problems in health management

The major problems in health management was analyzed based on the opinion of the sample respondents. The major reasons cited by the respondents are indicated in Table 9.14. The major problem suggested include non availability of specialist and paramedicines in health centres, difficulty in accessing the hospital due to distance, problems on cleanliness/ sanitation, lack of adequate effective medicines, poor infrastructure, drinking water problem and work related stress. Some of the respondents perceived work related stress as a problem in health management. Drinking water problem was found to be a significant problem in the capture sector.

Table 9.14: Problems in health management (Frequency)

Sl. No.	Problems	Marine Capture	Mariculture	Inland capture	Cold water fisheries	Fresh water Aquaculture	Brackish water Aquaculture	Marketing and processing	Total
1	Difficulty in accessing the hospital due to distance	45		155	25	28	89	66	405
2	Non availability of specialist and paramedicines in health centers	213	40	167	34	58	32	106	1081
3	Poor infrastructure	136	22	159	22	37	12	43	431
4	Lack of adequate effective medicines	207	28	190	22	29	23	60	559
5	Problems on Cleanliness/ Sanitation	80	50	341		38	34	34	577
6	Drinking water problem	95	79	198	28	12	11	22	445
7	Work related stress	17	17	54	23	29	43	1	184
9	Total	793	236	1264	154	231	244	332	3685

D. Income status

The income profiling of the respondent households are analyzed using income patterns, respondents involvement in non fisheries activities and expenditure pattern. In addition the indebtedness and savings were analyzed using details on savings, indebtedness , sources of lending organization, purpose of availing loan and suggestions for enhancing the income and employment generation.

Table 9.15: Income status of the respondents across sectors (Monthly Rs.)

Sl. No.	Sector	Enterprise					
		Fishery	Labour	Agriculture	Business	Others	Total
1.	Marine Capture	6757	957	270	577	182	8742
2.	Mariculture	4720	1785	175	85	44	6809
3.	Inland capture	1333	576	297	377	74	2657
4.	Cold water fisheries	1997	889	812	255	164	4117
5.	Fresh water Aquaculture	4976	287	549	274	81	6166
6.	Brackish water Aquaculture	4768	702	751	846	438	7505
7.	Marketing and processing	5865	724	17	194	227	7027
8.	Total	4345 (70.68)	846 (13.77)	410 (6.67)	373 (6.07)	173 (2.81)	6146 (100)

Figures in parenthesis indicate percentage to total

The income sources of the respondent households comprised of income from fishery, business, agriculture, labour services, and other service sectors. The highest monthly average income was through fisheries sector with an average amount of Rs. 4345 (70.68 % of the total income) followed by income from business sector at Rs. 846 (13.77 %), labour at Rs. 410 (6.67 %) for agriculture, Rs 373 (6.07 %) for business and Others Rs. 173 (2.81 %).

The highest average monthly income was noticed in marine capture sector at Rs. 8742 and the least was noticed in inland capture sector (Figure 9.14).The fisheries monthly average income was most for marine capture fisheries sector followed by marketing and processing and the least for inland capture. Labour monthly average income was most for mariculture (Rs. 1785) and the least for freshwater aquaculture (Rs. 287). Agricultural monthly average income was most for cold water fisheries (Rs. 812) and least for marketing and processing sector (Rs. 17).

The details of the income pattern of the respondent household across the different sectors are given in Figure 9.11 and 9.12.

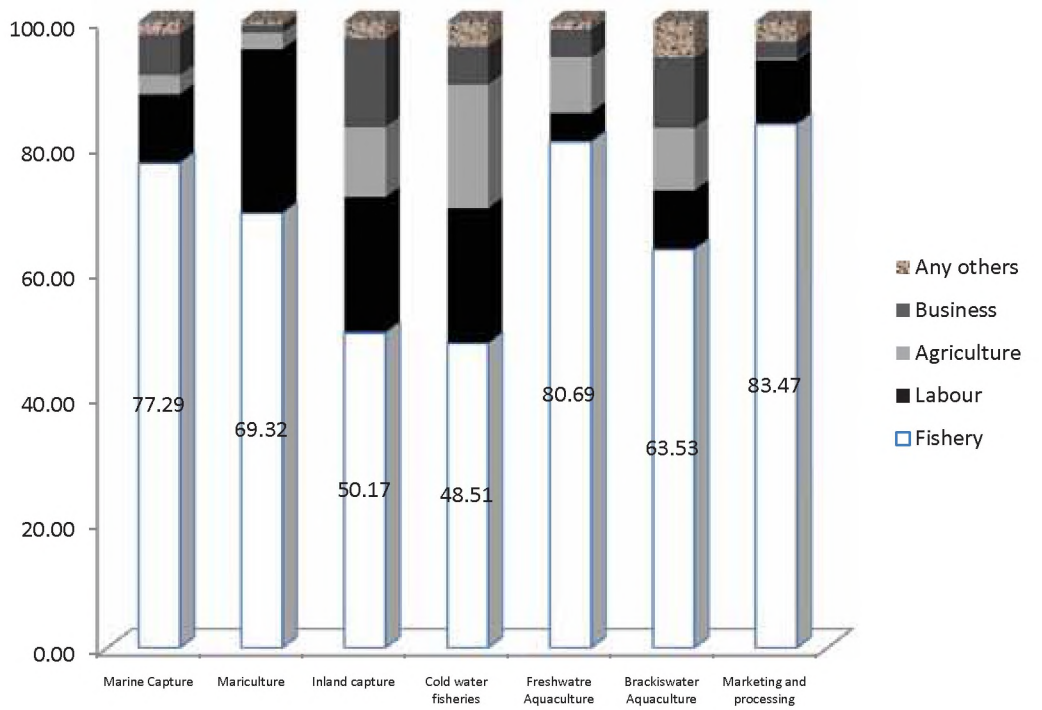


Fig. 9.11: Income from different enterprises across different sector

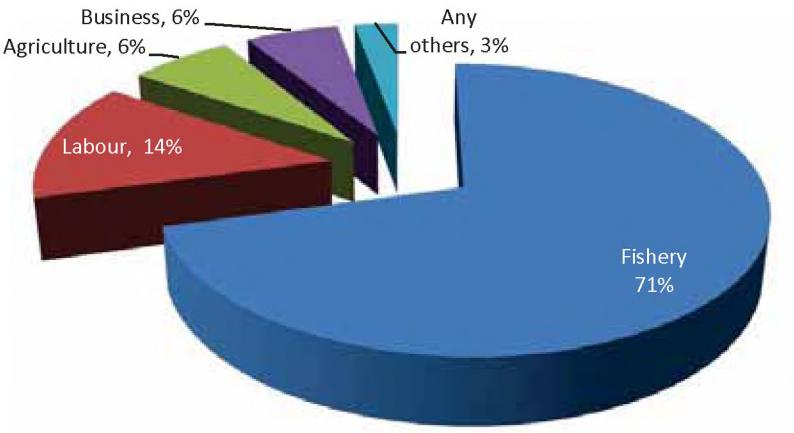


Figure 9.12: Income patterns of respondents across sectors

(i) Involvement in non fisheries activities

The Involvement of respondents' households in non fisheries activities are illustrated in the Table 9.16.

The analysis on the respondents' households involvement in the non fisheries activities indicated that 71.45 per cent of the total respondents were involved in non-fisheries activities, which provided an additional source of income. Among the non fisheries activities it was found that labour was the most important source of income followed by business. The labour as a source of income was highest for fresh water and brackish water aquaculture. The major non fishing activities involved by respondents were business, labour, and other service sectors. The total number of respondents involved in business was 769. The result clearly indicated the existence and practice of alternative avocation in the selected households across the different sectors (Figure 9.13 and 9.14).

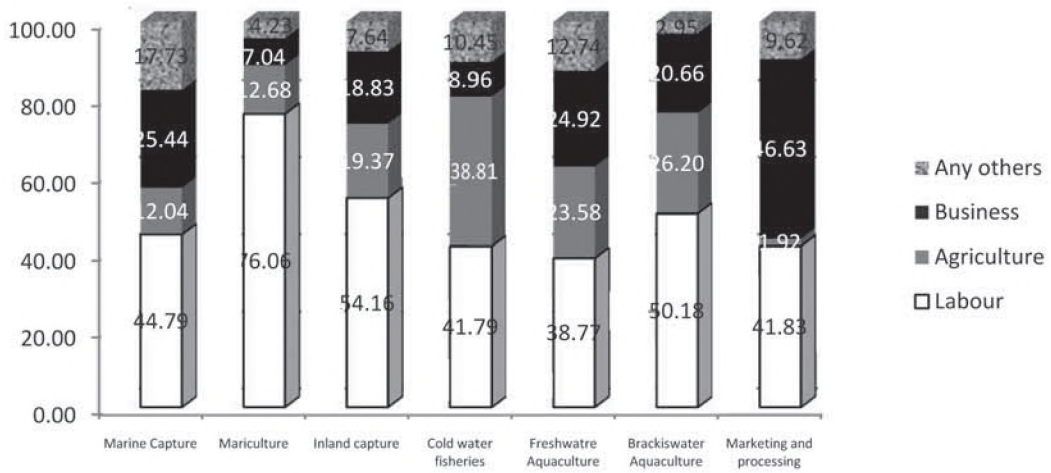


Fig 9.13. Respondents involvement in different enterprises

Table 9.16: Respondents involvement in non-fisheries activities

Sl. No.	Sector	Labour	Agri-culture	Busi-ness	Any oth-ers	Total
1	Marine Capture	331	89	188	131	739
2	Mariculture	54	9	5	3	71
3	Inland capture	397	142	138	56	733
4	Cold water fisheries	28	26	6	7	67
5	Freshwater Aquaculture	347	211	223	114	895
6	Brackish water Aquaculture	272	142	112	16	542
7	Marketing and processing	87	4	97	20	208
8	Total	1516	623	769	347	3255

(ii) Pattern of expenditure

The average monthly expenditure pattern of the different heads worked out that on an average Rs. 5107.90 was incurred on the households with a share of Rs.1910.75 (40.31 per cent) for food, Rs.698.65 for personal expenses, Rs 696.10 for durables, Rs.440.70 for education, Rs. 484.13 for clothing and Rs. 391.04 for medical facilities. The maximum monthly expenditure per family was observed in marine capture fisheries sector and least for inland capture fisheries (Table 9.17).

It is seen from the table that food contributed to the maximum share of family expenditure. Education, Entertainment and Social Security measures hold increasing proposition in the family expenditure across the selected coastal states.

Table 9.17: Pattern of expenditure of the fisher family (Monthly Rs)

Sl. No.	Sector	Items								
		Food	Clothing	Fuel	Medical	Education	Entertain-ment	Personal	Durables	Total
1.	Marine Capture	2741.98	547.48	374.78	665.22	487.58	424.70	893.04	826.57	6961.37
2.	Mariculture	2341.37	479.00	340.00	397.00	410.15	240.00	1916.00	245.00	6368.52
3.	Inland capture	1056.37	186.05	96.61	166.37	195.27	65.04	150.80	167.69	2084.20
4.	Cold water fisheries	886.00	454.50	267.00	413.50	732.50	107.00	463.00	145.50	3469.00
5.	Freshwater Aquaculture	1306.42	218.50	109.25	186.63	341.40	100.14	423.34	1866.32	4552.00
6.	Brackish water Aquaculture	3036.26	461.23	390.00	446.98	533.65	249.31	499.81	318.76	5936.00
7.	Marketing and processing	2006.86	1042.14	238.14	461.57	385.00	403.29	544.57	1302.86	6384.43
8.	Total	1910.75	484.13	259.40	391.04	440.79	227.07	698.65	696.10	5107.9

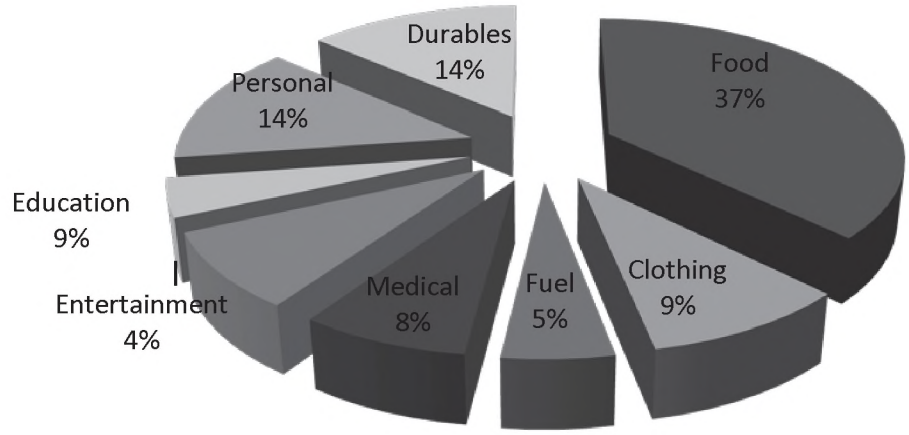


Fig: 9.14: Pattern of expenditure of the fisher family (Monthly Rs.)

(iii) Indebtedness and Savings

The saving details of the respondent's household indicated that 59.10 per cent of the respondents have no savings. 30.97 per cent of the respondent households possessed a saving of less than ₹50000, 5.99 per cent of the respondents have a saving of between Rs. 50,000 to 1,00,000 and 3.65 per cent of the respondents had a saving of more than one lakh rupees (Figure 9.16 and 9.17).

It was found that around 10 per cent of the respondents from the freshwater aquaculture and brackish water aquaculture sector possess saving of more than a lakh.

Table 9.18: Saving details of respondent households

Sl. No.	Sector	Frequency of respondents having Savings				Total
		Nil	< 50 k	50-100.00k	>100.00K	
1.	Marine Capture	1081	499	59	2	1641
2.	Mariculture	173	32	16	4	225
3.	Inland capture	275	407	77	17	776
4.	Cold water fisheries	22	28	0	0	50
5.	Freshwater Aquaculture	352	62	42	46	502
6.	Brackish water Aquaculture	378	33	36	52	499
7.	Marketing and processing	206	236	21	32	495
8.	Total	2487	1297	251	153	4188

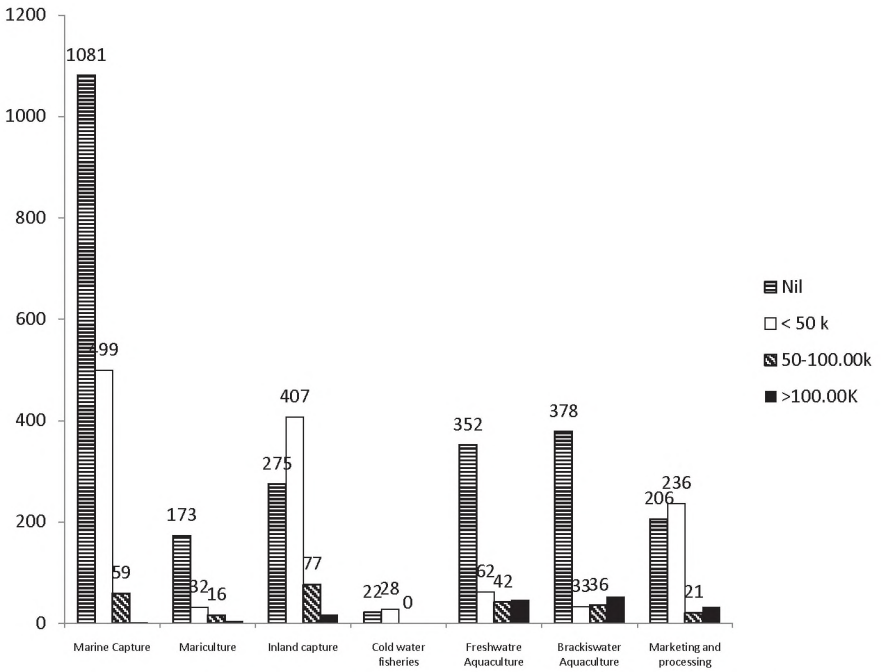


Fig: 9.15: Savings details of respondent fishers across different sector

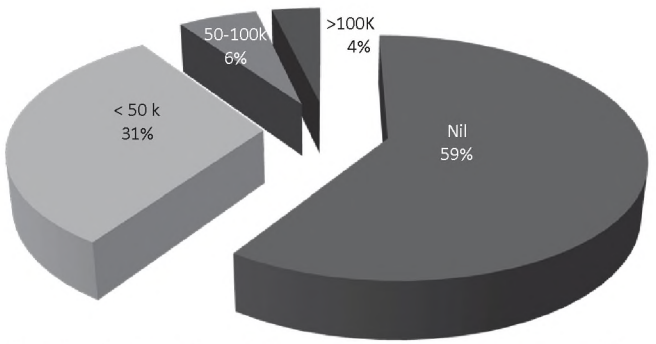


Fig 9.16: Details of respondent fishers possessing savings across different sector

(iv) Indebtedness

The lack of savings and the need for the sustenance of the livelihood often lead to indebtedness.

The results indicated that the average amount of indebtedness per person was Rs. 39,807 and the average amount repaid was Rs. 9149.23.The average level of repayment was found to be 25.93. The per cent level of fishers indebted was found to be 48.12 per cent.

The average level of amount indebted was highest for marketing and processing (Rs. 70643.14) and the lowest was for inland capture sector (Rs. 21133.40). The repayment was the highest for inland capture (46.27 per cent) and lowest for marketing and processing (10.56 per cent) . The level of fishers indebted was most in brackish water sector (55.20 per cent) and lowest for cold water fisheries sector (30.00 per cent) (Figure 9.17 and 9.18)

Table 9.19: Level and extent of indebtedness across sector

Sl. No.	Sector	Number of persons	Average	Average	Per cent repaid	Total	per cent fishers indebted
1.	Marine Capture	785	32027.66	6941.82	21.67	1649	47.60
2.	Mariculture	101	29931.85	5945.27	19.86	225	44.89
3.	Inland capture	478	21133.40	9778.51	46.27	981	48.73
4.	Cold water fisheries	15	35946.00	14269.00	39.70	50	30.00
5.	Fresh water Aquaculture	238	48797.00	12456.00	25.53	502	47.41
6.	Brackish water Aquaculture	276	40173.00	7197.00	17.92	500	55.20
7.	Marketing and processing	299	70643.14	7458.43	10.56	648	46.14
8.	Total	2192	39807.44	9149.43	25.93	4555	48.12

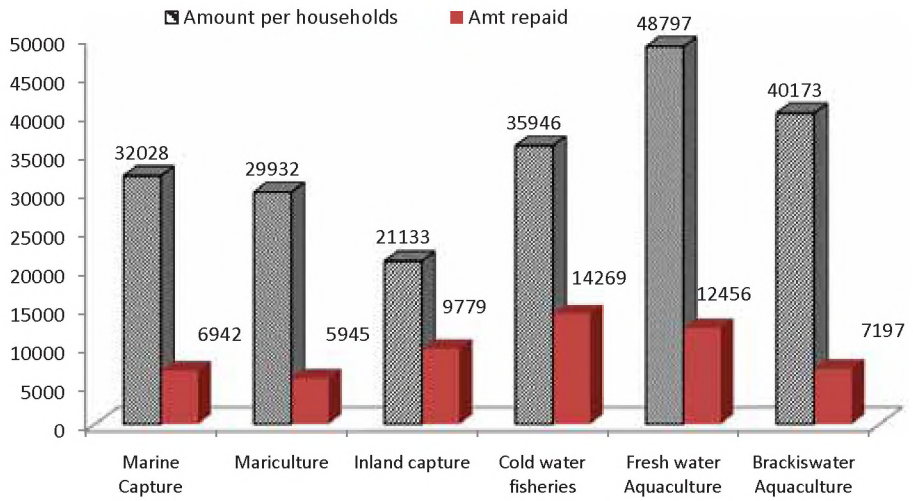


Fig: 9.17: Average Level of indebtedness

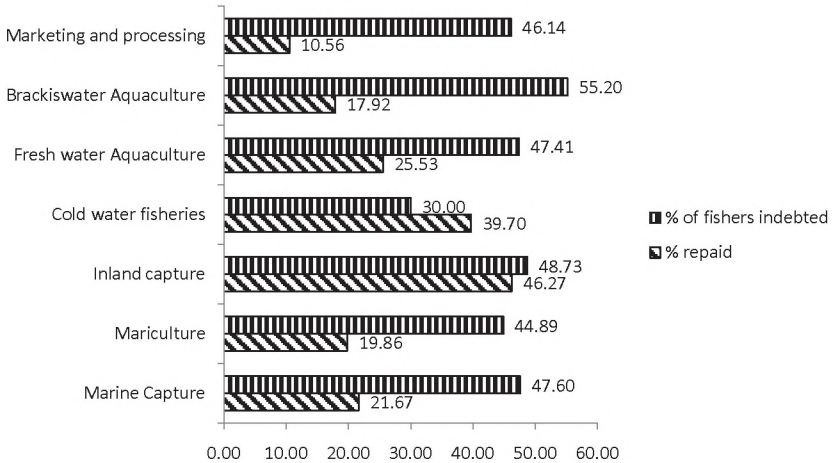


Fig 9.18: Level of repayment

(v) Sources of lending

The indebtedness often results in availing loans from different institutions. The major sources of lending organizations include banks, co-operatives, private money lenders, friends/ relatives and jewel loans. The details of the sources of money lending as availed by the respondent households is furnished in Table 9.20.

A total of 1966 respondents had availed loans for various purposes. It was found that banks provided the maximum (501) followed by private money lenders (482).

Private money lenders were the major source of lending for the marine capture, inland capture sectors. Jewel loans were found to be a major source for lending in the marine capture and marketing and processing sector (Figure 9.19).

Table 9.20: Sources of lending

Sl. No.	Sources	Marine Capture	Mariculture	Inland capture	Cold water fisheries	Fresh water Aquaculture	Brackish water Aquaculture	Marketing and processing	Total
1.	Banks	179	40	105	2	77	38	60	501
2.	Co-operative	76	30	54	5	9	42	50	266
3.	Private money lenders	246	21	142	8	21	18	26	482
4.	Friends / Relatives	37	0	16	0	2	6	60	121
5.	Jewel loans	169	6	2	0		12	118	307
6.	(SHGs)	132	5	68	0	42	10	32	289
7.	Total	839	102	387	15	151	126	346	1966

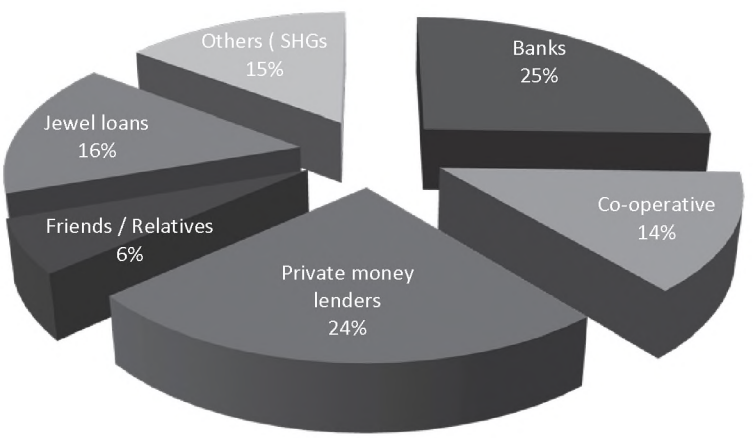


Fig 9.19. Sources of lending

(vi) Purpose of availing loans

The details on the purpose of availing loans and number of loans availed by the respondent households are indicated in Table 9.21.The major purposes for which loans were availed included purchase of craft/ gear and other fishing related equipment/aquaculture , house construction / land purchase, marriage expenses., education and health and social security etc (Figure 9.20).

Fisheries and aquaculture related activities like purchase of gears and other fishing related equipments were found to be the purpose of availing loans amongst 34.99 of the respondents across the sector .The purpose of house construction and land purchase was the major reason for availing loans among 12.27 per cent of the respondents across the sector. Marriage expense, Security and Education and Health was found as the reasons for availing loans among 7.51, 5.60 and 4.97 per cent of the respondents across the sector.

It was found that on an average only 34.99 per cent of the loans availed were used for the fisheries and aquaculture related activities ranging from 24.39 per cent in inland capture to 80.00 in cold water fisheries (Figure 9.20).

Table 9.14: Purpose of availing loans

Sl. No.	Purpose	Marine Capture	Mariculture	Inland capture	Cold water fisheries	Fresh water Aquaculture	Brackish water Aquaculture	Marketing and processing	Total
1.	Purchase of craft/ gear and other fishing related equipments / Aquaculture	280	31	90	8	366	245	149	1169
2.	House construction/ Land purchase	128	0	52	2	69	93	66	410
3.	Marriage expense	50	41	98	0	0	19	43	251
4.	Education	53	11	31	0	20	32	19	166
5.	Health and Social Security	43	8	1	0	3	10	122	187
6.	Any others (business and purchase)	160	8	97	0	44	101	34	444
6.	Total	714	99	369	10	502	500	433	3341

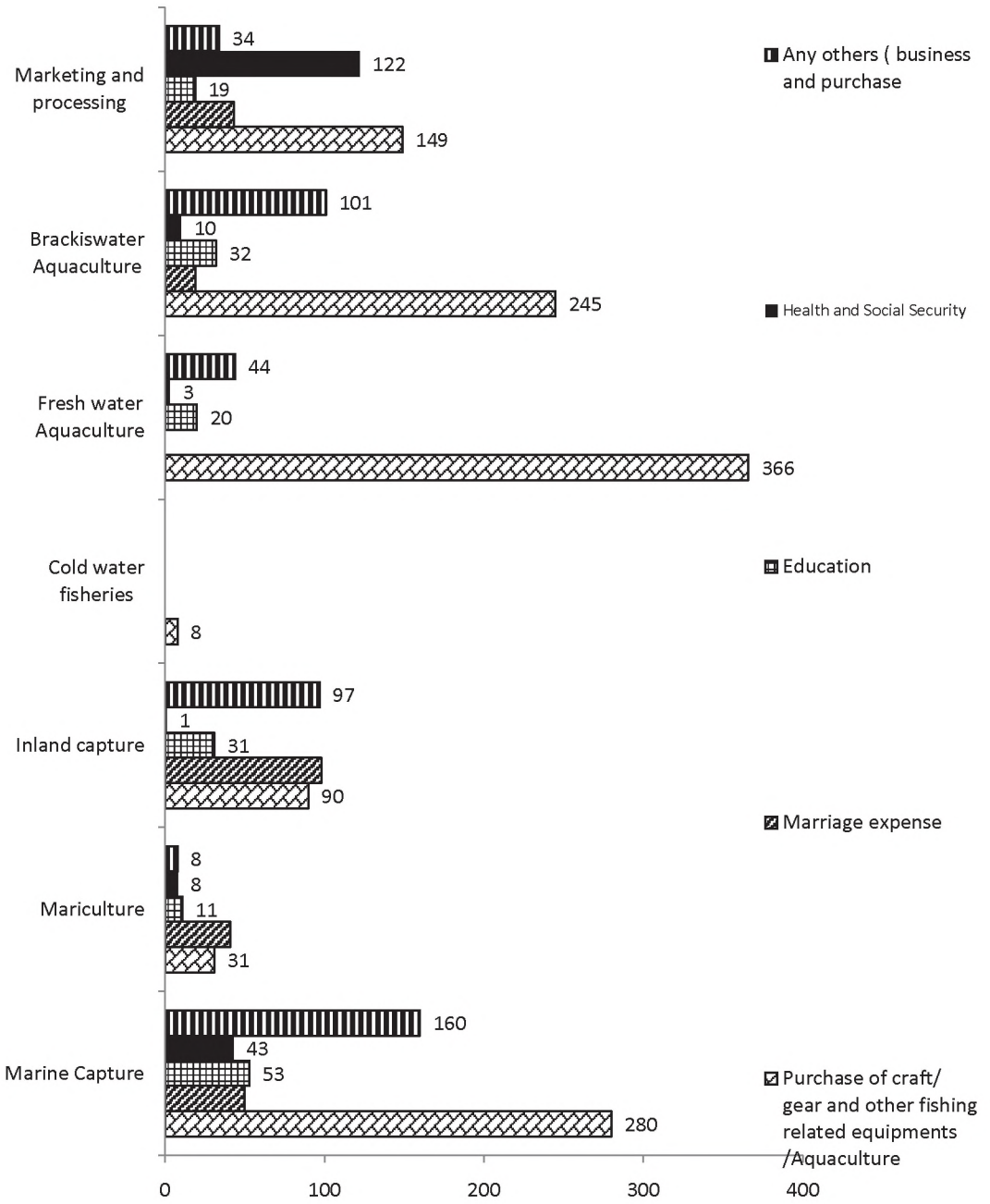


Fig 9.20 Purpose for availing loans

Conclusion

The study on the assessment of the literacy, income and health of the fishers concluded that

- The fishers literacy levels are comparable with agriculture households
- The access to educational institutions are good or even better of when compared to agriculture
- The health status appears appreciable with no life style disease noticed
- The health parameters related to child birth rate, mortality rate are highly appreciable on comparison
- Marginal infant and maternal mortalities are reported
- The income levels doesn't indicate any poverty among the household even though relative poverty exists
- The level of indebtedness is high but with more than 20% repaid
- Major sources of lending organisation was found to be institutional credits
- 25 per cent or more of the loans was facilitated through private money lenders
- The usage of loans had been mostly for non fisheries purposes leading to NPAs

AN ASSESSMENT OF LITERACY, HEALTH AND INCOME OF FISHERS IN INDIA

SURVEY SCHEDULE

A.	Name of the fisher/ farmer				
(i)	Primary Occupation If Allied Specify	Capture / Culture / Allied			
(ii)	Address				
1.2	Phone No. / Mobile No. with STD code				
I	**Literacy Profile**				
	Family members	Age	Sex	Educational level	Continuing (C)/ Drop out (D)
(i)					
(ii)					
(iii)					
(iv)					
(v)					
(vi)					
(vii)					
2.0	**Distance in km to nearby**				
(i)	Primary school				
(ii)	High school				
(iii)	College				
(iv)	Professional colleges				
II	**Health Profile**				
1.0	**Vaccination regime of infants / children (less than 15 years)**				
	Disease	Done at what age (year)		Has ever been discontinued (Y/N)	If Yes Why?
(i)	Pox				
(ii)	BCG				

(iii)	MMR								
(iv)	Polio								
(v)	Any Others								
2.0	**Birth weight of infants**								
	Sex	Weight (kg)							
(i)	Male								
(ii)	Female								
3.0	**Is there any death of mother/ child during delivery in your family?**								
(i)	If yes, mother or child?								
(ii)	Reasons								
4.0	**Problem / Disease** (F- Times in a year) (P- Previous occurrence-months back)	Adult				Child (Both 5-15 &<5 yrs)			
		M		F		M		F	
		F	P	F	P	F	P	F	P
(i)	Fever / Flu								
(ii)	Body Ache								
(iii)	Diahorrea								
(iv)	Gastroenteric disease								
(v)	T.B.								
(vi)	Cardiac failure								
(vii)	Skin disorder								
(viii)	Reproductive disorders								
(ix)	Anemia								
(x)	AIDS								
(xi)	Any other								
5.0	**Disease Management**								
(i)	Distance to nearby	PHC : km				Hospital: km			
(ii)	Are u satisfied with the facilities	Y/ N		If No Then why?					
(iii)	Problems in health management								
(iv)	Suggestions								
III	**Income profile**								
1.0	**Share of total income (Weekly) of the fisher family**								
	Source	Income (Rs.)							
(i)	Fishery								

(ii)	Labour	
(iii)	Agriculture	
(iv)	Business	
(v)	Any Other	
(vi)	Total	
2.0	**Pattern of expenditure of the fisher family (Weekly)**	
	Item	Expenditure (Rs.)
(i)	Food	
(ii)	Clothing	
(iii)	Fuel for cooking	
(iv)	Medical expenses	
(v)	Education	
(vi)	Entertainment expenses	
(vii)	Personal expenses	
(viii)	Durables (Annual)	
3.0	**Indebtedness and Savings**	
(i)	Saving Details	
(ii)	Is there any indebtedness	Yes or No
(iii)	If Yes Amount :	
(iv)	Lending organization	
(v)	Purpose	
(vi)	Details of repayment	
(vii)	Reason for non repayment	
(viii)	Suggestions	

Signature of the investigator: : _____

Name of the investigator: _____

Date:

Place:

ISBN 978-93-82263-05-0